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SCIENCE FICTION

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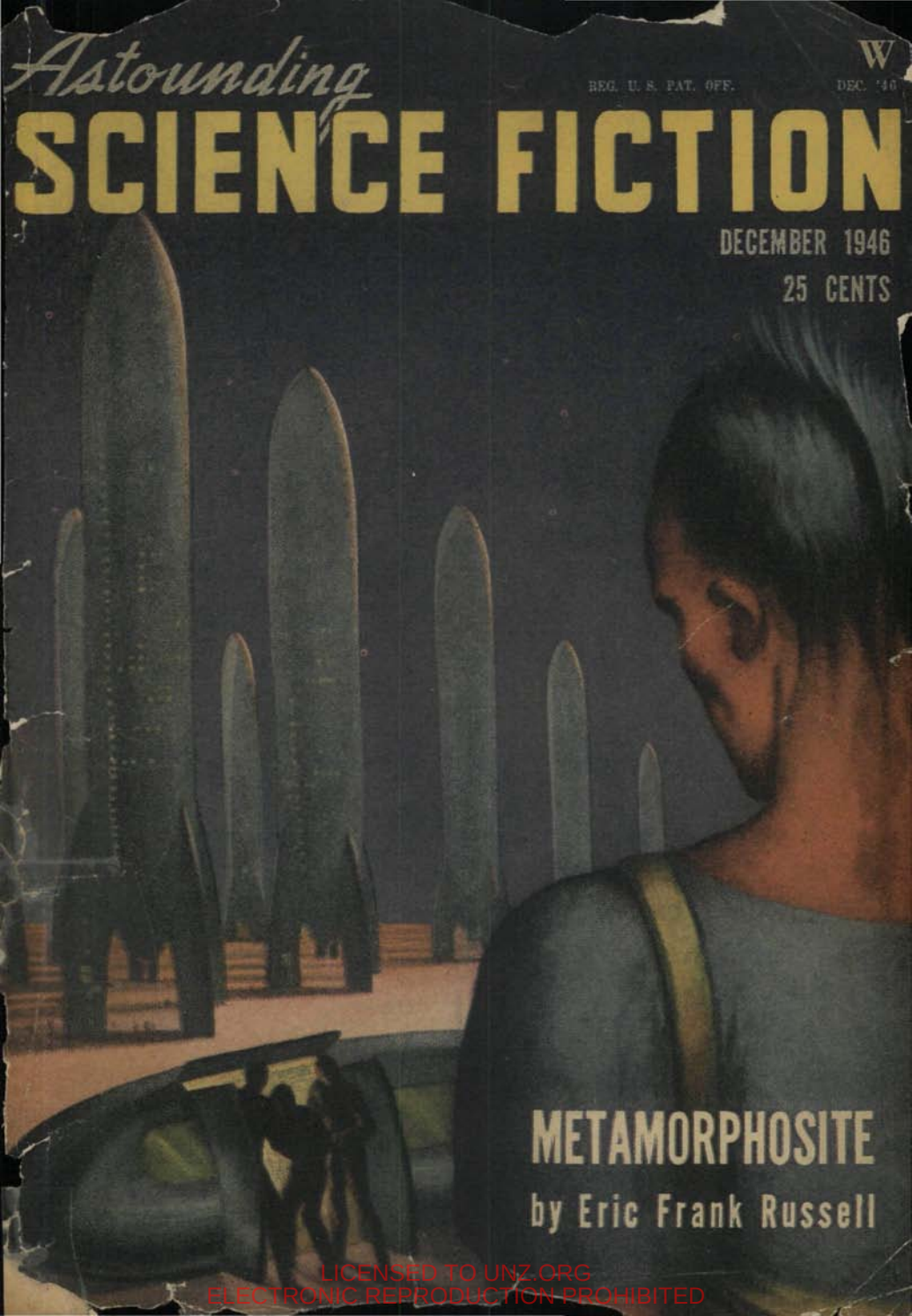

METAMORPHOSITE

by Eric Frank Russell

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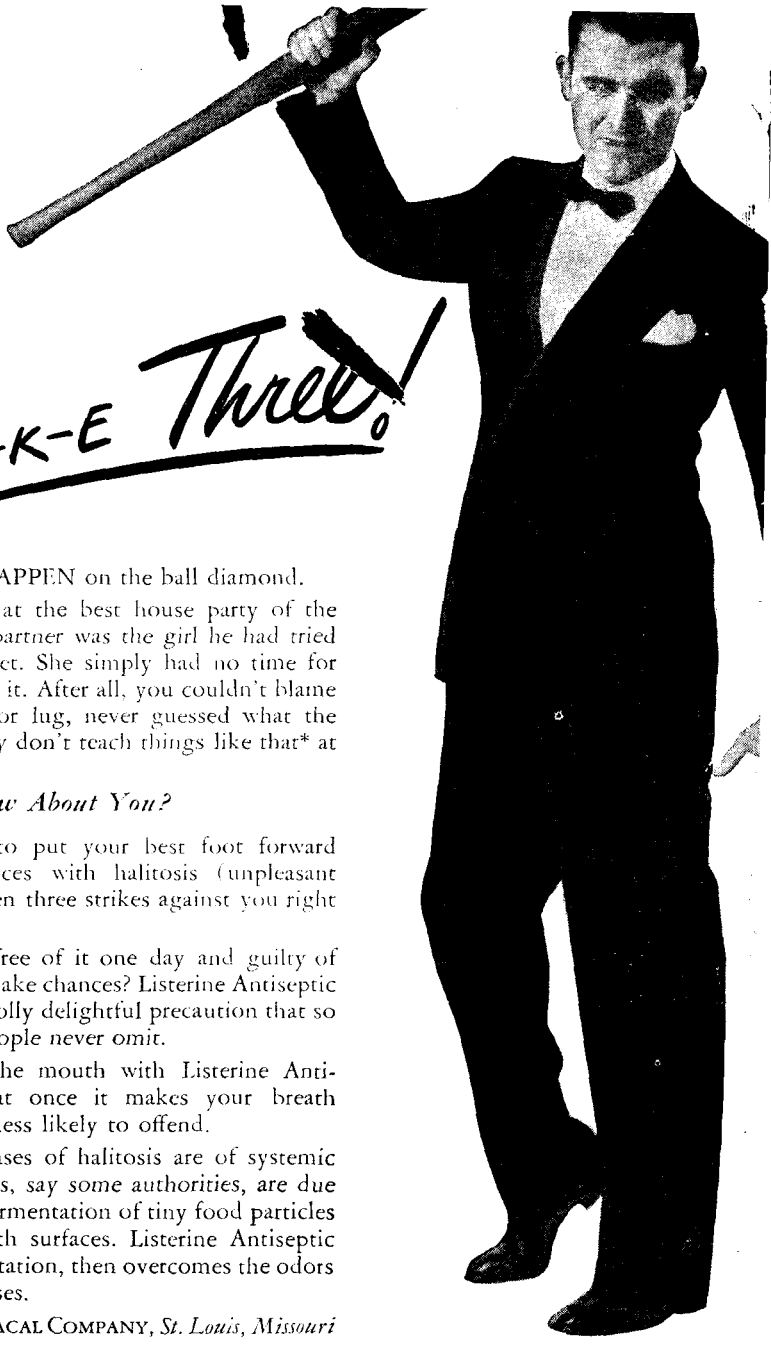

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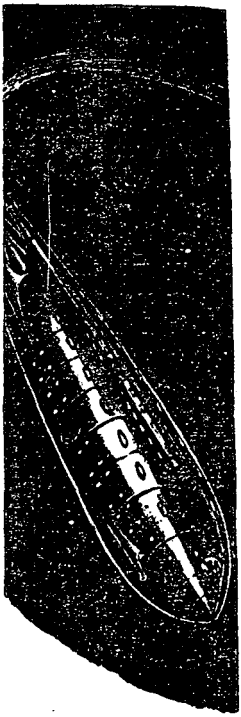

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OUR MONTHLY CONTEST

The war is over, many men are back, including tens of thousands of professional technicians. Many readers of Science Fiction recently servicing radar, sonar, and similar equipments, engineers at home who were doing research on such devices, are now free to carry on civilian operations again.

I'd like to point out that Astounding Science Fiction pays cash money for stories; that we need stories constantly; that we are found with beaming smiles and great joy when a new, unknown author shows up with a bell-ringer, and that we need new authors.

It works like this: each month we run a contest, open to all comers. We pay up to $2,000 first prize for a long novel, and about $300 goes out every month for a novelette. For a short story, we pay from $75 to $150, depending on length.

You do *not* have to be an old-time author to sell stories; our regular buying is a wide-open, everybody-welcome contest.

Many of our top authors today sold us the first story submitted—the first story ever submitted anywhere.

We do *not* want stories "like" those of present authors; we want new angles, fresh ideas, a different, new, and interesting approach.

While this contest is, in the nature of things, open to all comers, in practice only regular readers of Science Fiction are apt to make the grade. Of those readers, past experience indicates professional technical people have a better chance of becoming permanent top-rankers.

We have no staff writers; every author is a free-lance.

We don't recommend writing for Science Fiction as a full-time career, but it's a handy source of income for auxiliaries. You can buy a new radio with a short story, or a really fine camera. Or if you're really patient, you can buy a car with a couple of novelettes, or a short serial. With a long serial you can get the down payment on a house—if you can find a house!

Incidentally, most of the authors, once they get started, tend to find that writing a story is something like reading one—it can be as surprising to find which way your characters take you as to find which way another author's plot twists!

Mechanically, preparation of manuscript is simple enough. Type on one side of standard typewriter paper, double spaced. (We need room for printers' marks between lines.) There's one more important thing: most amateur authors fail to make the grade by omitting that very necessary final operation. We will *not* pay for a story unless you *send it in.* Finish it and send it—don't add dust-catchers in the overcrowded desk.

If you do send it in, you'll hear from us in about two weeks or less.

THE EDITOR.

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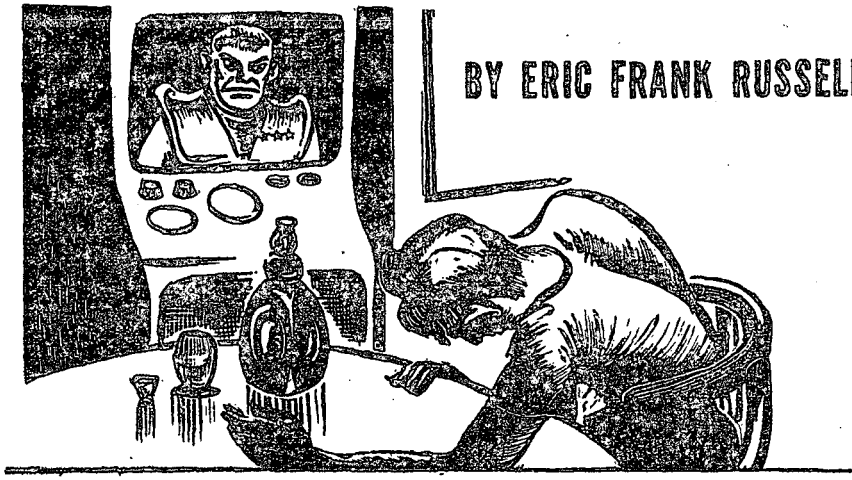

BY ERIC FRANK RUSSELL

METAMORPHOSITE

***Building** a galactic empire takes time—a very long time. And it may not be the same people who started the job when they finish—*

They let him pause halfway along the gangway so that his eyes could absorb the imposing scene. He stood in the middle of the high metal track, his left hand firmly grasping a side rail, and gazed into the four hundred feet chasm beneath. Then he studied the immense space vessels lying in adjacent berths, his stare tracing their gangways to their respective elevator towers behind which stood a great cluster of buildings whence the spaceport control column soared to the clouds. The height at which he stood, and the enormous dimensions of his surroundings, made him a little, doll-like figure, a man dwarfed by the mightiest works of man.

Watching him closely, his guards noted that he did not seem especially impressed. His eyes appeared to discard sheer dimensions while they sought the true meaning behind it all. His face was quite impassive as he looked around, but all his glances were swift, intelligent and assured. He comprehended things with that quick confidence which denotes an agile mind. One feature was prominent in the mystery enveloping him; it was evident that he was no dope.

Lieutenant Roka pushed past the two rearmost guards, leaned on the rail beside the silent watcher, and explained, "This is Madistine Spaceport. There are twenty

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others like it upon this planet. There are from two to twenty more on every one of four thousand other planets, and a few of them considerably bigger. The Empire is the greatest thing ever known or ever likely to be known. Now you see what you're up against."

" 'Numbers and size,' " quoth the other. He smiled faintly and shrugged. "What of them?"

"You'll learn what!" Roka promised. He, too, smiled, his teeth showing white and clean. "An organization can grow so tremendous that it's far, far bigger than the men who maintain it. From then on, its continued growth and development are well-nigh inevitable. It's an irresistible force with no immovable object big enough to stop it. It's a juggernaut. It's destiny, or whatever you care to call it."

"Bigness," murmured the other. "How you love bigness." He leaned over the railing, peered into the chasm. "In all probability down there is an enemy you've not conquered yet."

"Such as what?" demanded Roka.

"A cancer bug." The other's eyes swung up, gazed amusedly into the lieutenant's. "Eh?" He shrugged again. "Alas, for brief mortality!"

"Move on," snapped Roka to the leading guard.

The procession shuffled on, two guards, then the prisoner, then Roka, then two more guards. Reaching the tower at the end of the track, the sextet took an elevator to ground level, found a jet car waiting for them, a long, black sedan with the Silver Comet of the Empire embossed on its sides. Two men uniformed in myrtle green occupied its front seats while a third stood by the open door at rear.

"Lieutenant Roka with the specimen and appropriate documents," said Roka. He indicated the prisoner with a brief gesture, then handed the third man a leather dispatch case. After that, he felt in one pocket, extracted a printed pad, added, "Sign here, please."

The official signed, returned the pad, tossed the dispatch case into the back of the car.

"All right," he said to the prisoner. "Get in."

Still impassive, the other got into the car, relaxed on the rear seat. Roka bent through the doorway, offered a hand.

"Well, sorry to see the last of you. We were just getting to know each other, weren't we? Don't get any funny ideas, will you? You're here under duress, but remember that you're also somewhat of an ambassador—that'll give you the right angle on things. Best of luck!"

"Thanks." The prisoner shook the proffered hand, shifted over as the green uniformed official clambered in beside him. The door slammed, the jets roared, the car shot smoothly off. The prisoner smiled faintly as he caught Roka's final wave.

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"Nice guy, Roka," offered the official.

"Quite."

"Specimen," the official chuckled. "Always they call 'em specimens. Whether of human shape or not, any seemingly high or presumably intelligent form of life imported from any newly discovered planet is, in bureaucratic jargon, a specimen. So that's what you are, whether you like it or whether you don't. Mustn't let it worry you, though. Nearly every worthwhile specimen has grabbed himself a high official post when his planet has become part of the Empire."

"Nothing worries me," assured the specimen easily.

"No?"

"No."

The official became self-conscious. He picked the dispatch case off the floor, jiggled it aimlessly around, judged its weight, then flopped it on his lap. The two in front maintained grim silence and scowled steadily through the windshield as the car swung along a broad avenue.

At good speed they swooped over a humpback crossing, overtook a couple of highly colored, streamlined cars, swung left at the end of the avenue. This brought them up against a huge pair of metal gates set in a great stone wall. The place would have looked like a jail to the newcomer if he'd known what jails look like—which he didn't.

The gates heaved themselves open, revealing a broad drive which ran between well-tended lawns to the main entrance of a long, low building with a clock tower at its center. The entrance, another metal job heavy enough to withstand a howitzer, lay directly beneath the tower. The black sedan curved sidewise before it, stopped with a faint hiss of air brakes.

"This is it." The official at the back of the car opened a door, heaved himself out, dragging the case after him. His prisoner followed, shut the door, and the sedan swooped away.

"You see," said the man in green uniform. He gestured toward the lawns and the distant wall. "There's the wall, the gate, and a space from here to there in which you'd be immediately seen by the patrols. Beyond that wall are a thousand other hazards of which you know nothing. I'm telling you this because here's where you'll have your home until matters get settled. I would advise you not to let your impatience overcome your judgment, as others have done. It's no use running away when you've nowhere to run."

"Thanks," acknowledged the other. "I won't run until I've good reason and think I know where I'm going."

The official gave him a sharp look. A rather ordinary fellow, he decided, a little under Empire average in height, slender, dark, thirty-ish and moderately good-looking. But possessed of the cockiness of youth. Under examination he'd probably prove boastful and misleading. He sighed his misgiving.

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A pity that they hadn't snatched somebody a good deal older.

"Harumph!" he said apropos of nothing.

He approached the door, the other following. The door opened of its own accord, the pair entered a big hall, were met by another official in myrtle green.

"A specimen from a new world," said the escort, "for immediate examination."

The second official stared curiously at the newcomer, sniffed in disdain, said, "O.K.—you know where to take him."

Their destination proved to be a large examination room at one end of a marble corridor. Here, the official handed over the dispatch case to a man in white, departed without further comment. There were seven men and one woman in the room, all garbed in white.

They studied the specimen calculatingly, then the woman asked, "You have learned our language?"

"Yes."

"Very well, then, you may undress. Remove all your clothes."

"Not likely!" said the victim in a level voice.

The woman didn't change expression. She bent over an official form lying on her desk, wrote in a neat hand in the proper section: "Sex convention normal." Then she went out.

When the door had shut behind her, the clothes came off. The seven got to work on the prisoner, completing the form as they went along. They did the job quietly, methodically, as an obvious matter of old-established routine. Height: four-point-two lineal units. Weight: seventy-seven m i g r a d s. Hair: type-S, with front peaked. No wisdom teeth. All fingers double-jointed. Every piece of data was accepted as if it were perfectly normal, and jotted down on the official form. Evidently they were accustomed to dealing with entities differing from whatever was regarded as the Empire norm.

They X-rayed his cranium, throat, chest and abdomen from front, back and both sides and dutifully recorded that something that wasn't an appendix was located where his appendix ought to be. Down went the details, every one of them. Membraned epiglottis. Optical astigmatism: left eye point seven, right eye point four. Lapped glands in throat in lieu of tonsils. Crenated ear lobes. Cerebral serrations complex and deep.

"Satisfied?" he asked when apparently they'd finished with him.

"You can put on your clothes."

The head man of the seven studied the almost completed form thoughtfully. He watched the subject dressing himself, noted the careful, deliberate manner in which the garments were resumed one by one. He called three of his assistants, conferred with them in low tones.

Finally he wrote at the bottom of the form: "Not necessarily a more advanced type, but definitely a variation. Possibly dangerous. Should be watched." Unlocking the dispatch case, he shoved the

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form in on top of the other papers it contained, locked the case, gave it to an assistant. "Take him along to the next stage."

Stage two was another room almost as large as its predecessor and made to look larger by virtue of comparative emptiness. Its sole furnishings consisted of an enormous carpet with pile so heavy it had to be waded through, also a large desk of glossy plastic and two pneumatic chairs. The walls were of translucite and the ceiling emitted a frosty glow.

In the chair behind the desk reposed a swarthy, saturnine individual with lean features and a hooked nose. His dress was dapper and a jeweled ring ornamented his left index finger. His black eyes gazed speculatively as the prisoner was marched the full length of the carpet and seated in the second chair. He accepted the leather case, unlocked it, spent a long time submitting its contents to careful examination.

In the end, he said, "So it took them eight months to get you here even at supra-spatial speed. *Tut tut*, how we grow! Life won't be long enough if this goes on. They've brought you a devil of a distance, eh? And they taught you our language on the way. Did you have much difficulty in learning it?"

"None," said the prisoner.

"You have a natural aptitude for languages, I suppose?"

"I wouldn't know."

The dark man leaned forward, a sudden gleam in his eyes. A faint smell of morocco leather exuded from him. His speech was smooth.

"Your answer implies that there is only one language employed on your home world."

"Does it?" The prisoner stared blankly at his questioner.

The other sat back again, thought for a moment, then went on, "It is easy to discern that you are not in the humor to be co-operative. I don't know why. You've been treated with every courtesy and consideration, or should have been. Have you any complaint to make on that score?"

"No," said the prisoner bluntly.

"Why not?" The dark man made no attempt to conceal his surprise. "This is the point where almost invariably I am treated to an impassioned tirade about kidnaping. But you don't complain?"

"What good would it do me?"

"No good whatever," assured the other.

"See?" The prisoner settled himself more comfortably in his chair. His smile was grim.

For a while, the dark man contemplated the jewel in his ring, twisting it this way and that to catch the lights from its facets. Eventually he wrote upon the form the one word: "Fatalistic," after which he murmured, "Well, we'll see how far we can get, anyway." He picked up a paper. "Your name is Harold Harold-Myra?"

"That's correct."

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"Mine's Helman, by the way. Remember it, because you may need me sometime. Now this Harold-Myra—is that your family name?"

"It is the compound of my father's and mother's names."

"Hm-m-m! I suppose that that's the usual practice on your world?"

"Yes."

"What if you marry a girl named Betty?"

"My name would still be Harold-Myra," the prisoner informed. "Hers would still be the compound of her own parents' names. But our children would be called Harold-Betty."

"I see. Now according to this report, you were removed from a satellite after two of our ships had landed on its parent planet and failed to take off again."

"I was certainly removed from a satellite. I know nothing about your ships."

"Do you know why they failed to take off?"

"How could I? I wasn't there!"

Helman frowned, chewed his lower lip, then rasped, "It is I who am supposed to be putting the questions."

"Go ahead then," said Harold Harold-Myra.

"Your unspoken thought being, 'And a lot of good it may do you,'" put in Helman shrewdly. He frowned again, added the word: "Stubborn" to the form before him. "It seems to me," he went on, "that both of us are behaving rather childishly. Mutual antagonism profits no one. Why can't we adopt the right attitude towards each other? Let's be frank, eh?" He smiled, revealing bright dentures. "I'll put my cards on the table and you put yours."

"Let's see yours."

Helman's smile vanished as quickly as it had appeared. He looked momentarily pained. "Distrustful" went down on the form. He spoke, choosing his words carefully.

"I take it that you learned a lot about the Empire during your trip here. You know that it is a mighty organization of various forms of intelligent life, most of them, as it happens, strongly resembling yours and mine, and all of them owing allegiance to the particular solar system in which you're now located. You have been told, or should have been told, that the Empire sprang from here, that throughout many, many centuries it has spread over four thousand worlds, and that it's still spreading."

"I've heard all of that," admitted the other.

"Good! Then you'll be able to understand that you're no more than a temporary victim of our further growth, but, in many ways, a lucky man."

"I fail to perceive the luck."

"You will, you will," soothed Helman. "All in good time." Mechanically, his smile had returned, and he was making an attempt at joviality. "Now I can assure you that an organization so old and so widespread as ours is not without a modicum of wisdom. Our science has given us incredible

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powers, including the power to blow whole worlds apart and desiccate them utterly, but that doesn't make us disregard caution. After a wealth of experience covering a multitude of planets we've learned that we're still not too great to be brought low. Indeed, for all our mighty power, we can err in manner disastrous to us all. So we step carefully."

"Sounds as if someone once put a scare into you," commented Harold Harold-Myra.

Helman hesitated, then said, "As a matter of fact, someone did. I'll tell you about it. Many decades ago we made a first landing on a new planet. The ship failed to take off. Our exploratory vessels always travel in threes, so a second vessel went down to the aid of its fellow. That didn't take off either. But the third ship, waiting in space, got a despairing message warning that the world held highly intelligent life of an elusive and parasitic type."

"And they confiscated the bodies you'd so kindly provided," suggested Harold.

"You know all about this life form?" Helman asked. His fingers slid toward an invisible spot on the surface of his desk.

"It's the first I've heard of them," replied the other. "Confiscation was logical."

"I suppose so," Helman admitted with some reluctance. He went on, his keen eyes on his listener. "They didn't get the chance to take over everyone. A few men realized their peril in the nick of time, locked themselves in one vessel away from the parasites and away from their stricken fellows. There weren't enough of them to take off, so they beamed a warning. The third ship saw the menace at once; if action wasn't taken swiftly it meant that we'd handed the keys of the cosmos to unknown powers. They destroyed both ships with one atomic bomb. Later, a task ship arrived, took the stern action we deemed necessary, and dropped a planet wrecker. The world dissolved into flashing gases. It was an exceedingly narrow squeak. The Empire, for all its wealth, ingenuity and might, could not stand if no citizen knew the real nature of his neighbor."

"A sticky situation," admitted Harold Harold-Myra. "I see now where I come in—I am a sample."

"Precisely." Helman was jovial again. "All we wish to discover is whether your world is a safe one."

"Safe for what?"

"For straightforward contact."

"Contact for what?" Harold persisted.

"Dear me! I'd have thought a person of your intelligence would see the mutual advantages to be gained from a meeting of different cultures."

"I can see the advantages all right. I can also see the consequences."

"To what do you refer?" Helman's amiability began to evaporate.

"Embodiment in your Empire."

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"*Tut,*" said Helman impatiently. "Your world would join us only of its own free will. In the second place, what's wrong with being part of the Empire? In the third, how d'you know that your opinions coincide with those of your fellows? They may think differently. They may prove eager to come in."

"It looks like it seeing that you've got two ships stuck there."

"Ah, then you admit that they're forcibly detained?"

"I admit nothing. For all I know, your crews may be sitting there congratulating themselves on getting away from the Empire—while my people are taking steps to throw them out."

Helman's lean face went a shade darker. His long, slender hands clenched and unclenched while his disciplined mind exerted itself to suppress the retort which his emotion strove to voice.

Then he said, "Citizens of the Empire don't run away from it. Those who do run don't get very far."

"A denial and an affirmative," commented Harold amusedly. "All in one breath. You can't have it both ways. Either they run or they don't."

"You know perfectly well what I meant." Helman, speaking slowly and evenly, wasn't going to let this specimen bait him. "The desire to flee is as remote as the uselessness of it is complete."

"The former being due to the latter?"

"Not at all!" said Helman sharply.

"You damn your ramshackle Empire with every remark you make," Harold informed. "I reckon I know it better than you do."

"And how do you presume to know our Empire?" inquired Helman. His brows arched in sarcastic interrogation. "On what basis do you consider yourself competent to judge it?"

"On the basis of history," Harold told him. "Your people are sufficiently like us to be like us—and if you can't understand that remark, well, I can't help it. On my world we're old, incredibly old, and we've learned a lot from a past which is long and lurid. We've had empires by the dozens, though none as great as yours. They all went the same way—down the sinkhole. They all vanished for the same fundamental and inevitable reasons. Empires come and empires go, but little men go on forever."

"Thanks," said Helman quickly. He wrote on the form: "Anarchistic," then, after further thought, added: "Somewhat of a crackpot."

Harold Harold-Myra smiled slowly and a little sadly. The writing was not within line of his vision, but he knew what had been written as surely as if he'd written it himself. To the people of his ancient planet it was not necessary to look at things in order to see them.

Pushing the form to one side, Helman said, "The position is that

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every time we make a landing we take the tremendous risk of presenting our secrets of space conquest to people of unknown abilities and doubtful ambitions. It's a chance that has to be taken. You understand that?" He noted the other's curt nod, then went on, "As matters stand at present, your world holds two of our best vessels. Your people, for all we can tell, may be able to gain a perfect understanding of them, copy them in large numbers, even improve on them. Your people may take to the cosmos, spreading ideas that don't coincide with ours. Therefore, in theory, the choice is war or peace. Actually, the choice for your people will be a simple one: co-operation or dessication. I hate to tell you this, but your hostile manner forces me to do so."

"Uncommunicative might be a better word than hostile," suggested Harold Harold-Myra.

"Those who're not with us are against us," retorted Helman. "We're not being dictatorial; merely realistic. Upon what sort of information we can get out of you depends the action we take regarding your world. You are, you must understand, the representative of your kind. We are quite willing to accept that your people resemble you to within reasonable degree, and from our analysis of you we'll decide whether—"

"We get canonized or vaporized," put in Harold.

"If you like." Helman refused to be disturbed. He'd now acquired the *sang-froid* of one conscious of mastery. "It is for you to decide the fate of your planet. It's an enormous responsibility to place on one man's shoulders, but there it is, and you've got to bear it. And remember, we've other methods of extracting from you the information we require. Now, for the last time, are you willing to subject yourself to my cross-examination, or are you not?"

"The answer is," said Harold carefully, "not!"

"Very well then." Helman accepted it phlegmatically. He pressed the spot on his desk. "You compel me to turn from friendly interrogation to forcible analysis. I regret it, but it is your own choice." Two attendants entered, and he said to them, "Take him to stage three."

The escorting pair left him in this third and smaller room and he had plenty of time to look around before the three men engaged therein condescended to notice him. They were all in white, this trio, but more alert and less automatic than the white-garbed personnel of the medical examination room. Two of them were young, tall, muscular, and hard of countenance. The third was short, thickset, middle-aged and had a neatly clipped beard.

Briskly they were switching on a huge array of apparatus covering one wall of the room. The set-up was a mass of plastic panels, dials, meters, buttons, switches, sockets with corded plugs, and multi-connection pieces. From inside or

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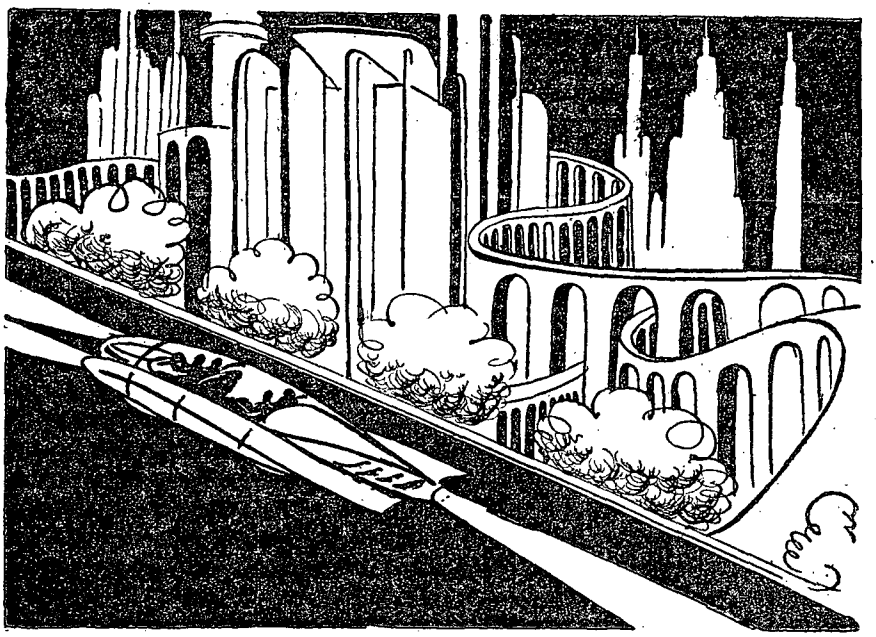

close behind this affair came a low, steady hum. Before it, centrally positioned, was a chair.

Satisfied that all was in readiness, the bearded man said to Harold, "O.K., be seated." He signed to his two assistants who stepped forward as if eager to cope with a refusal.

Harold smiled, waved a negligent hand, sat himself in the chair. Working swiftly, the three attached cushioned metal bands to his ankles, calves, thighs, chest, neck and head. Flexible metal tubes ran from the bands to the middle of the apparatus while, in addition, the one about his head was connected to a thin, multicore cable.

They adjusted the controls to give certain readings on particular meters, after which the bearded one fixed glasses on his nose, picked up a paper, stared at it myopically. He spoke to the subject in the chair.

"I am about to ask you a series of questions. They will be so phrased that the answers may be given as simple negatives or affirmatives. You can please yourself whether or not you reply vocally —it is a matter of total indifference to me."

He glanced at Harold and his eyes, distorted into hugeness behind thick-lensed glasses, were cold and blank. His finger pressed a button; across the room a camera whirred into action, began to record the readings on the various meters.

Disregarding everything else, and keeping his attention wholly on the

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man in the chair, the bearded one said, "You were discovered on a satellite—yes or no?"

Harold grinned reminiscently, did not reply.

"Therefore your people know how to traverse space?"

No reply.

"In fact they can go further than to a mere satellite. They can reach neighboring planets—yes or no?"

No reply.

"Already they have explored neighboring planets?"

No reply.

"The truth is that they can do even better than that—they have reached other solar systems?"

He smiled once more, enigmatically.

"Your world is a world by itself?"

Silence.

"It is one of an association of worlds?"

Silence.

"It is the outpost world of another Empire?"

Silence.

"But that Empire is smaller than ours?"

No response.

"Greater than ours?"

"Heavens, I've been led to believe that yours is the greatest ever," said Harold sardonically.

"Be quiet!" One of the young ones standing at his side gave him an irate thrust on the shoulder.

"Or what?"

"Or we'll slap your ears off!"

The bearded man, who had paused expressionlessly through this brief interlude, carried on nonchalantly.

"Your kind are the highest form of life on your planet? There is no other intelligent life thereon? You knew of no other intelligent life anywhere previous to encountering emissaries of the Empire?"

The questioner was in no way disturbed by his victim's complete lack of response, and his bearing made that fact clear. Occasionally peering at the papers in his hand, but mostly favoring his listener with a cold, owlish stare, he ploughed steadily on. The questions reached one hundred, two hundred, then Harold lost count of them. Some were substitutes or alternatives for others, some made cross reference with others asked before or to be asked later, some were obvious traps. All were cogent and pointed. All met stubborn silence.

They finished at length, and the bearded one put away his papers with the grumbling comment, "It's going to take us all night to rationalize this lot!" He gave Harold a reproving stare. "You might just as well have talked in the first place. It would have saved us a lot of bother and gained you a lot of credit."

"Would it?" Harold was incredulous.

"Take him away," snapped the bearded man.

One of the young men looked questioningly at the oldster, who understood the unspoken query and responded, "No, not there. Not yet, anyway. It mightn't be neces-

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sary. Let's see what we've got first." He took off his glasses, scratched his beard. "Put him in his apartment. Give him something to eat." He cackled gratingly. "Let the condemned man eat a hearty meal."

The apartment proved to be compact, well-appointed, comfortable. Three rooms: bathroom, bedroom, sitting room, the latter with a filled bookcase, a large electric radiator, sunken heating panels for extra warmth, and a magniscreen television set.

Harold sprawled at ease in a soft, enveloping chair, watched a short-haired, burly man wheel in a generous meal. Hungry as he was, his attention didn't turn to the food. He kept it fixed on the burly man who, unconscious of the persistent scrutiny, methodically put out the meat, bread, fruit, cakes and coffee.

As the other finished his task, Harold said casually, "What are those lizardlike things that wear black uniforms with silver braid?"

"Dranes." Short-hair turned around, gazed dully at the prisoner. His face was heavy, muscular, his eyes small, his forehead low. "We calls 'em Dranes."

"Yes, but what are they?"

"Oh, just another life form, I guess. From some other planet—maybe from one called Drane. I dunno. I used to know, but I've forgotten."

"You don't like them, eh?" suggested Harold.

"Who does?" He frowned with the unusual strain of thought, his small eyes shrinking still smaller. "I like to have ideas of my own, see? I don't care for any lizards reading my mind and telling the world what I'd sooner keep to myself, see? A man wants privacy—especially sometimes."

"So they're telepaths!" It was Harold's turn to frown. "Hm-m-m!" He mused anxiously. The other began to shove his empty meal trolley toward the door, and Harold went on hurriedly, "Any of them hereabouts?"

"No, it's too late in the evening. And there ain't a lot of them on this planet, thank Pete! Only a few here. They do some sort of official work, I dunno what. A couple of them got important jobs right in this dump, but they'll be home now. Good riddance, I says!" He scowled to show his intense dislike of the mysterious Dranes. "A guy can think what he likes while they're away." He pushed his trolley outside, followed it and closed the door. The lock clicked quietly, ominously.

Harold got on with his meal while he waited for angry men to come for him. Beardface and his two assistants had indicated that nothing more would be done with him before morning, but this last episode would speed things up considerably. He hastened his eating, vaguely surprised that he was getting it finished without interruption. They were less quick on the uptake than he'd antici-

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pated. He employed the time usefully in working out a plan of campaign.

The apartment made his problem tough. He'd already given it a thorough scrutiny, noted that its decorated walls and doors were all of heavy metal. The windows were of armorglass molded in one piece over metal frames with sturdy, closely set bars. It was more than an apartment; it was a vault.

There was a very tiny lens cunningly concealed in the wall high up in one corner. It would have escaped discovery by anyone with lesser powers of observation. He'd found another mounted on the stem of the hour hand of the clock. It looked like a jewel. He knew it to be a scanner of some kind, and suspected that there were others yet to be found. Where there were scanners there would also be microphones, midget jobs hard to dig out when you don't want to make a search too obvious. Oh, yes, they'd know all about his little conversation with Short-hair—and they'd be along.

They were. The lock clicked open just as he ended his meal. Helman came in followed by a huge fellow in uniform. The latter closed the door, leaned his broad back against it, pursed his lips in a silent whistle while he studied the room with obvious boredom. Helman went to a chair, sat in it, crossed his legs, looked intently at the prisoner. A vein pulsed in his forehead and the effect of it was menacing.

He said, "I've been on the televox to Roka. He swears that he's never mentioned the Dranes in your presence. He's positive that they've never been mentioned or described in your hearing by anyone on the ship. Nothing was said about them by the guards who brought you here. You've seen none in this building. So how d'you know about them?"

"Mystifying, isn't it?" commented Harold pleasantly.

"There is only one way in which you could have found out about the Dranes," Helman went on. "When the examiners finished with you in stage three an assistant pondered the notion of passing you along to stage four, but the idea was dropped for the time being. Stage four is operated by the Dranes."

"Really?" said Harold. He affected polite surprise.

"The Dranes were never mentioned," persisted Helman, his hard eyes fixed on his listener, "but they were thought of. You read those thoughts. You are a telepath!"

"And you're surprised by the obvious?"

"It wasn't obvious because it wasn't expected," Helman retorted. "On four thousand worlds there are only eleven truly telepathic life forms and not one of them human in shape. You're the first humanoid possessing that power we've discovered to date."

"Nevertheless," persisted Harold, "it should have been obvious. My refusal to co-operate—or my stubbornness as you insist on calling it—had good reason. I per-

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ceived all the thoughts behind your questions. I didn't like them. I still don't like them."

"Then you'll like even less the ones I'm thinking now," snapped Helman.

"I don't," Harold agreed. "You've sent out a call for the Dranes, ordered them to come fast, and you think they'll be here pretty soon. You expect them to suck me dry. You've great confidence in their powers even though you can't conceive the full extent of mine." He stood up, smiled as Helman uncrossed his legs with a look of sudden alarm. He stared into Helman's black eyes, and his own were sparkling queerly. "I think," he said, "that this is a good time for us to go trundle our hoops—don't you?"

"Yes," Helman murmured. Clumsily he got to his feet, stood there with an air of troubled preoccupation. "Yes, sure!"

The guard at the door straightened up, his big hands held close to his sides. He looked inquiringly at the vacant Helman. When Helman failed to respond, he shifted his gaze to the prisoner, kept the gaze fixed while slowly the alertness faded from his own optics.

Then, although he'd not been spoken to, he said hoarsely, "O.K., we'll get along. We'll get a move on." He opened the door.

The three filed out, the guard leading, Helman in the rear. They moved rapidly along the corridors, passing other uniformed individuals without challenge or comment until they reached the main hall. Here, the man in myrtle green, whose little office held the lever controlling the automatic doors, sat at his desk and felt disposed to be officious.

"You can't take him out until you've signed him out, stating where he's being taken, and on whose authority," he enunciated flatly.

"On my authority," said Helman. He voiced the words in stilted tones as if he were a ventriloquist's dummy, but the officious one failed to notice it.

"Oh, all right," he growled. He shoved a large, heavy tome to one end of his desk. "Sign there. Name in column one, destination in column two, time of return in column three." He looked at the huge guard who was watching dumbly, emitted a resigned sigh, inquired, "I suppose you need a car?"

"Yes," said Helman mechanically.

The official pressed a button; a sonorous gong clanged somewhere outside the building. Then he pulled his tiny lever; the great doors swung open. The trio strolled out with deceptive casualness, waited a moment while the doors closed behind them. It was fairly dark now, but not completely so, for a powdering of stars lay across the sky; and a steady glow of light emanated from the surrounding city.

Presently a jet car swept around one end of the building, stopped before them. The three got in.

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Harold sat at the back between Helman and the big guard, both of whom were strangely silent, ruminative. The driver turned around, showed them a face with raised eyebrows.

"Downtown," uttered Helman curtly.

The driver nodded, faced front. The car rolled toward the gates in the distant wall, reached them, but they remained closed. Two men in green emerged from the shadow of the wall, focused light beams on the vehicle's occupants.

One said, "Inquisitor Helman, one specimen—I guess it's O.K." He waved his light beam toward the gates which parted slowly and ponderously. Emitting a roar from its jets, the car swept through.

They dropped Harold Harold-Myra in the mid-southern section of the city where buildings grew tallest and crowds swarmed thickest. Helman and the guard got out of the car, talked with him while the driver waited out of earshot.

"You will both go home," Harold ordered, "remembering nothing of this and behaving normally. Your forgetfulness will persist until sunrise. Until you see the sun you will be quite unable to recall anything which has occurred since you entered my room. Do you understand?"

"We understand."

Obediently they got back into the car. They were a pair of automatons. He stood on the sidewalk, watched their machine merge into the swirl of traffic and disappear. The sky was quite dark now, but the street was colorful with lights that shifted and flickered and sent eccentric shadows skittering across the pavement.

For a few minutes he stood quietly regarding the shadows and musing within himself. He was alone—alone against a world. It didn't bother him particularly. His situation was no different from that of his own people who formed a solitary world on the edge of a great Empire. He'd one advantage which so far had stood him in good stead: he knew his own powers. His opponents were ignorant in that respect. On the other hand, he suffered the disadvantage of being equally ignorant, for although he'd learned much about the people of the Empire, he still did not know the full extent of their powers. And theirs were likely to be worthy of respect. Alliance of varied life forms with varied talents could make a formidable combination. The battle was to be one of *homo superior* versus *homo sapiens* plus the Dranes plus other things of unknown abilities —with the odds much in favor of the combine.

Now that he was foot-loose and fancy-free he could appreciate that guard's argument that there's no point in being free unless one knows where to nurse one's freedom. The guard, though, had implied something and overlooked something else. He'd implied that there were places in which freedom could be preserved, and he'd forgotten that escapees have a flair for discovering unadvertised

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sanctuaries. If his own kind were half as wise and a quarter as crafty as they ought to be, thought Harold, the tracing of such a sanctuary should not be difficult.

He shrugged, turned to go, found himself confronted by a tall, thin fellow in black uniform with silver buttons and silver braid. The newcomer's features were gaunt and tough, and they changed color from gold to blood-red as the light from a nearby electric sign flickered over it.

Harold could hear the other's mind murmuring, *"Queer, outlandish clothes this fellow's wearing. Evidently a recent importee —maybe a specimen on the lam,"* even as the thinker's mouth opened and he said audibly, "Let me see your identity card!"

"Why?" asked Harold, stalling for time. Curse the clothes—he'd not had time to do anything about them yet.

"It's the regulation," the other returned irritably. "You should know that every citizen must produce his card when called upon to do so by the police." His eyes narrowed, his mind spoke silently but discernibly. *"Ah, he hesitates. It must be that he doesn't possess a card. This looks bad!"* He took a step forward.

Harold's eyes flamed with an odd glow. "You don't really want to see my card?" he said gently. "Do you?"

The policeman had a momentary struggle with himself before he answered, "No . . . no . . . of course not!"

"It was just your mistake?"

"Just my mistake!" admitted the other slowly. His mind was now completely muddled. A random thought, *"He's dangerous!"* fled wildly through the cerebral maze, pursued, outshouted and finally silenced by other, violently imposed thoughts saying, *"Silly mistake. Of course he's got a card. I interfere too much."*

With shocking suddenness, another thought broke in, registering clearly and succintly despite the telepathic hubbub of a hundred surrounding minds. *"By the Blue Sun, did you catch that, Gaeta? A fragment of hypnotic projection! Something about a card. Turn the car round!"*

A cold sweat beaded on Harold's spine, he closed his mind like a trap, sent his sharp gaze along the road. There was too great a flood of cars and too many swiftly changing lights to enable him to pick out any one vehicle turning in the distance. But he'd know that car if it came charging down upon him. Its driver might be of human shape, but its passengers would be lizardlike.

Machines whirled past him four, five and sometimes six abreast. The eerie voice which had faded suddenly came back, waxed strong, faded away again.

It said, *"I might be wrong, of course. But I'm sure the amplitude was sufficient for hypnosis. No, it's gone now—I can't pick it up at all. All these people make too much of a jumble on the neural band!"*

Another thought, a new one, an-

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swered impatiently, *"Oh, let it pass, you're not on duty now. If we don't—"* It waned to indiscernibility.

Then the policeman's mind came back, saying, *"Well, why am I standing here like a dummy? Why was I picking on this guy? It must've been for something! I didn't stop him for the fun of it—unless I'm scatty!"*

Harold said quickly and sharply, "You didn't stop me. I stopped you. Intelligence Service—remember?"

"Eh?" The cop opened his mouth, closed it, looked confused.

"Wait a moment," added Harold, a strong note of authority in his voice. He strained his perception anxiously. A river of surrounding thoughts flowed through his mind, but none with the power and clarity of the invisible Gaeta and his alert companion. Could they, too, close their minds? There wasn't any way of telling!

He gave it up, returned his attention to the cop, and said, "Intelligence Service. I showed you my official warrant. Good heavens, man, have you forgotten it already?"

"No." The man in black was disconcerted by this unexpected aggressiveness. The reference to a nonexistent Intelligence Service warrant made his confusion worse confounded. "No," he protested, "I haven't forgotten." Then, in weak effort to make some sort of a come-back. "But you started to say something, and I'm waiting to hear the rest."

Harold smiled, took him by the arm. "Look, I'm authorized to call upon you for assistance whenever needed. You know that, don't you?"

"Yes, sure, but—"

"What I want you to do is very simple. It's necessary that I change attire with a certain suspected individual and that he be kept out of circulation overnight. I'll point him out to you when he comes along. You're to tell him that you're taking him in for interrogation. You'll then conduct us somewhere where we can change clothes, preferably your own apartment if you've got one. I'll give you further instructions when we get there."

"All right," agreed the cop. He blinked as he tried to rationalize his mind. Thoughts gyrated bafflingly in his cranium. *"Not for you to reason why. Do your duty and ask no questions. Let higher-ups take the responsibility. This guy's got all the authority in the world—and he knows what he's doing."* There was something not quite right about those thoughts. They seemed to condense inward instead of expanding outward, as thoughts ought to do. But they were powerful enough, sensible enough, and he wasn't able to give birth to any contrary ideas. "All right," he repeated.

Studying the passers-by, Harold picked a man of his own height and build. Of all the apparel streaming past, this fellow's looked made

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to fit him to a nicety. He nudged the cop.

"That's the man."

The officer strode majestically forward, stopped the victim, said, "Police! I'm taking you in for interrogation."

"Me?" The man was dumfounded. "I've done nothing!"

"Then what've you got to worry about?"

"Nothing," hastily assured the other. He scowled with annoyance. "I guess I'll have to go. But it's a waste of time and a nuisance."

"So you think the Empire's business is a nuisance?" inquired Harold, joining the cop.

The victim favored him with a look of intense dislike, and complained, "Go on, try making a case against me. Having it stick will be something else!"

"We'll see!"

Cutting down a side street, the trio hit a broad avenue at its farther end. No cars here; it was solely for pedestrians. The road was divided into six moving strips, three traveling in each direction, slowest on the outsides, fastest in the middle. Small groups of people, some chatting volubly, some plunged in boredom, glided swiftly along the road and shrank in the distance. A steady rumbling sound came from beneath the rubbery surface of the road.

The three skipped onto an outer slow strip, thence to the medium fast strip, finally to the central rapid strip. The road bore them ten blocks before they left it. Harold could see it rolling on for at least ten blocks more.

The cop's apartment proved to be a modernistic, three-roomed bachelor flat on the second floor of a tall, graystone building. Here, the captive started to renew his protests, looked at Harold, found his opinions changing even as he formed them. He waxed co-operative, though in a manner more stupefied than willing. Emptying the contents of his pockets on a table, he exchanged clothes.

Now dressed in formal, less outlandish manner, Harold said to the police officer, "Take off your jacket and make yourself at home. No need to be formal on this job. We may be here some time yet. Get us a drink while I tell this fellow what's afoot." He waited until the cop had vanished into an adjoining room, then his eyes flamed at the vaguely disgruntled victim. "Sleep!" he commanded, "sleep!"

The man stirred in futile opposition, closed his eyes, let his head hang forward. His whole body slumped wearily in its chair. Raking rapidly through the personal possessions on the table, Harold found the fellow's identity card. Although he'd never seen such a document before, he wasted no time examining it, neither did he keep it. With quick dexterity, he dug the cop's wallet out of his discarded jacket, extracted the police identity card, substituted the other, replaced the wallet. The police card he put in his own pocket.

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Way back on the home planet it was an ancient adage that double moves are more confusing than single ones.

He was barely in time. The cop returned with a bottle of pink, oily liquid, sat down, looked dully at the sleeper, said, "Huh?" and transferred his lackluster stare to Harold. Then he blinked several times, each time more slowly than before, as if striving to keep his eyes open against an irresistible urge to keep them shut. He failed. Imitating his captive, he hung his head—and began to snore.

"Sleep," murmured Harold, "sleep on toward the dawn. Then you may awake. But not before!"

Leaning forward, he lifted a small, highly polished instrument from its leather case beneath the policeman's armpit. A weapon of some sort. Pointing it toward the window, he pressed the stud set in its butt. There was a sharp, hard crack, but no recoil. A perfect disk of glassite vanished from the center of the window. Cold air came in through the gap, bringing with it a smell like that of roasted resin. Giving the weapon a grim look, he shoved it back into its holster, dusted his fingers distastefully.

"So," he murmured, "discipline may be enforced by death. Verily, I'm back in the dark ages!"

Ignoring the sleepers, he made swift search of the room. The more he knew about the Empire's ordinary, everyday citizens the better it'd be for him. Knowledge—the right knowledge—was a powerful arm its own right. His people understood the value of intangibles.

Finished, he was about to leave when a tiny bell whirred somewhere within the wall. He traced the sound as emanating from behind a panel, debated the matter before investigating further. Potential danger lurked here; but nothing ventured, nothing gained. He slid the panel aside, found himself facing a tiny loudspeaker, a microphone, a lens, and a small, circular screen.

The screen was alive and vivid with color, and a stern, heavily jowled face posed in sharp focus within its frame. The caller raked the room with one quick, comprehending glance, switched his attention to Harold.

"So the missing Guarda *is* indisposed," he growled. "He slumbers before a bottle. He awaits three charges: absent from duty, improperly dressed, and drunk! We'll deal with this at once." He thinned his lips. "What is your name and the number of your identity card, citizen?"

"Find out," suggested Harold. He slammed the panel before the tiny scanner could make a permanent record of his features—if he had not done so already.

That was an unfortunate episode: it cut down his self-donated hours of grace to a few minutes. They'd be on their way already, and he'd have to move out fast.

He was out of the apartment and

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the building in a trice. A passing car stopped of its own accord and took him downtown. Its driver was blissfully unaware of the helplessness of his own helpfulness.

Here, the city seemed brighter than ever mostly because the deeper darkness of the sky enhanced the multitude of lights. A few stars still shone, and a string of colored balls drifted high against the backdrop where some unidentifiable vessel drove into space.

He merged with the crowds still thronging the sidewalks. There was safety in numbers. It's hard to pick one guy out of the mob. especially when he's dressed like the mob, behaves like the mob. For some time he moved around with the human swarm though his movements were not as aimless. He was listening to thoughts, seeking either of two thought-forms, one no more than slightly helpful, the other important. He found the former, not the latter.

A fat man wandered past him and broadcast the pleasurable notion of food shared in large company. He turned and followed the fat man, tracking him along three streets and another moving avenue. The fat man entered a huge restaurant with Harold at his heels. They took an unoccupied table together.

Plenty of active thoughts here. In fact the trouble was that there were far too many. They made a constant roar right across the telepathic band; it was difficult to separate one from another, still more difficult to determine who was emanating which. Nevertheless, he persisted in his effort to sort out individual broadcasts, taking his food slowly to justify remaining there as long as possible. Long after the fat man had left he was still seated there, listening, listening. There were many thoughts he found interesting, some revealing, some making near approach to the notions he sought, but none quite on the mark, not one.

In the end, he gave it up, took his check from the waiter. It was readily apparent what the waiter had on his mind, namely, this crazy stuff called money. Roka had told him a lot about money, even showing him samples of the junk. He remembered that Roka had been dumfounded by his ignorance concerning a common medium of exchange. With amusing superiority, the worthy lieutenant had assumed that Harold's people had yet to discover what they'd long since forgotten.

There had been some of this money—he didn't know just how much—in the pockets of this suit, but he'd left it all with the suit's hapless donor. There wasn't any point in snatching someone else's tokens. Besides, having managed without it all his life he wasn't going to become a slave to it now.

He paid the waiter with nothing, putting it into the fellow's hand with the lordly air of one dispensing a sizable sum. The waiter gratefully accepted nothing, put nothing into his pocket, initialed the check, bowed obsequiously. Then he rubbed his forehead, looked

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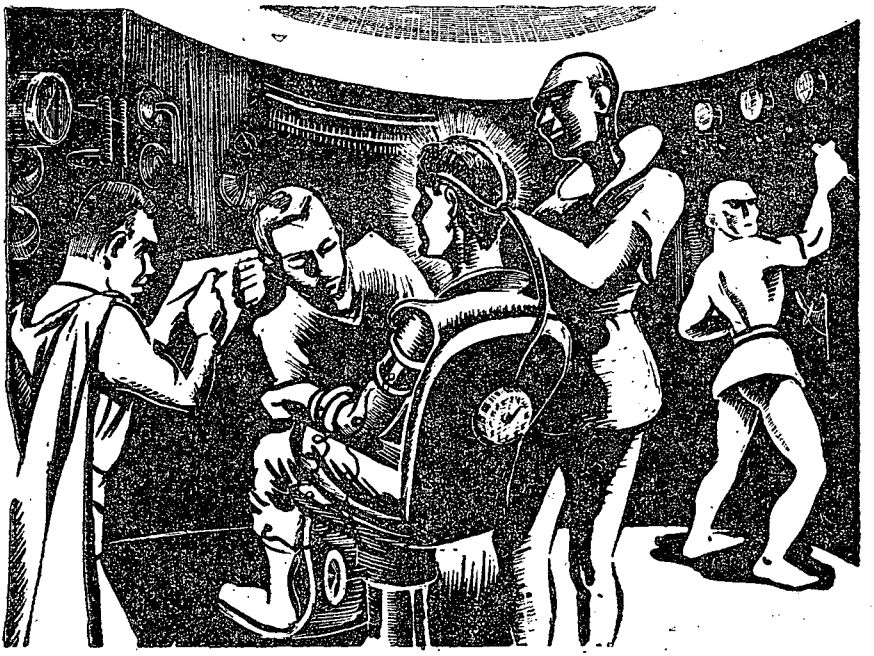

vague and confused, but said nothing. Harold went out.

It was on the sidewalk Harold made the contact he was seeking, though not in the manner he'd expected. He was looking for a mutinous thinker who might lead him to the underworld of mutinous thinkers. Instead, he found a friend.

The fellow was twenty yards away and walking toward him with a peculiarly loose-jointed gait. He was humanoid in all respects but one—his skin was reptilian. It was a smooth but scaly skin of silvery gray in which shone an underlying sheen of metallic blue. The pupils of his eyes were a very light gray, alert, intelligent.

Those eyes looked straight into Harold's as they came abreast, a flood of amity poured invisibly from them as he smiled and said in an undertone, "Come with me." He walked straight on, without a pause. He didn't look back to see whether Harold followed.

Harold didn't wait to consider the matter. This was a time for quick decision. Swiveling on one heel he trailed along behind the speaker. And as he trod warily after the other, his mind was active with thoughts, and his thinking was done within a mental shell through which nothing could probe.

Evidently the scaly man was an outsider, a product of some other world. His queer skin was proof of that. There were other factors,

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too. He hadn't read Harold's mind —Harold was positive of that—yet in some strange, inexplicable way he'd recognized a kinship between them and had acknowledged it without hesitation. Moreover, he was strolling along with his mind wide open, but Harold was totally unable to analyze his thoughts. Those thoughts, in all probability, were straightforward and logical enough, but they oscillated in and out of the extreme edge of the neural band. Picking them up was like trying to get frequency modulation on a receiver designed for amplitude modulation. Those thought-forms might be normal, but their waveforms were weird.

Still not looking back, the subject of his speculations turned into an apartment building took a levitator to the tenth floor. Here he unlocked a door, gazed around for the first time, smiled again at his follower, motioned him inside.

Harold went in. The other closed the door after him. There were two similar entities in the apartment. One sat on the edge of a table idly swinging his legs; the other lounged on a settee and was absorbed in a magazine.

"Oh, Melor, there's a—" began the one on the settee. He glanced up, saw the visitor, grinned in friendly fashion. Then his expression changed to one of surprise, and he said, "By the everlasting light, it's *you!* Where did you find him, Melor?"

This one's mind was fully as baffling and Harold found himself unable to get anything out of it. The same applied to the being perched upon the table: his thoughts wavered in and out of the borderline of detection.

"I found him on the street," replied the one called Melor, "and I invited him along. He has a most attractive smell." He sat down, invited Harold to do likewise. Looking at the one on the settee, he went on, "What did you mean by, 'Oh, it's *you'?* D'you know him?"

"No." The other switched on a teleset at his side. "They broadcast a call for him a few minutes ago. He's wanted—badly." He moved a second switch. "Here's the recording. Watch!"

The set's big screen lit up. A sour-faced man in flamboyant uniform appeared on the screen, spoke with official ponderousness.

"All citizens are warned to keep, watch for and, if possible, apprehend an escaped specimen recently brought from the Frontier. Name: Harold Harold-Myra. Description—" He went on at great length, giving everything in minute detail, then finished, "His attire is noticeably unconventional and he has not yet been provided with an identity card. Citizens should bear in mind that he may possess attributes not familiar to Empire races and that he is wanted alive. In case of necessity, call Police Emergency on Stud Four. Here is his likeness."

The screen went blank, lit up again, showed Harold's features in full color. He recognized part of his former prison in the background.

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Those midget scanners had done their job!

"*Tush!*" scoffed the being on the settee. He switched off, turned to Harold. "Well, you're in good hands. That's something. We wouldn't give anyone in authority a magni-belt to hold up his pants. My name's Tor. The one industriously doing nothing on the table is Vern. The one who brought you here is Melor. Our other names don't matter much. As maybe you've guessed, we aren't of this lousy, over-organized world. We're from Linga, a planet which is a devil of a long way off, too far away for my liking. The more I think of it, the farther it seems."

"It's no farther than my own world," said Harold. He leaned forward. "Look, can you read my mind?"

"Not a possibility of it," Tor answered. "You're like the local breed in that respect—you think pulsatingly and much too far down for us. Can you read ours?"

"I can't. You wobble in and out of my limit." He frowned. "What beats me is what made Melor pick me out if he can't read my thoughts."

"I smelled you," Melor put in.

"Huh?"

"That's not strictly correct, but it's the best way I can explain it. Most of the Empire's peoples have some peculiar faculty they call a sense of smell. We don't possess it. They talk about bad odors and sweet ones, which is gibberish to us. But we can sense affinities and oppositions, we can sort of 'smell' friends and enemies, instantly, infallibly. Don't ask me how we do it, for how can I tell you?"

"I see the difficulty," agreed Harold.

"On our world," Melor continued, "most life forms have this sense which seems peculiar to Linga. We've no tame animals and no wild ones—they're tame if you like them, wild if you don't. None would be driven by curiosity to make close approach to a hunter, none would flee timidly from someone anxious to pet them. Instinctively they know which is friend and which is enemy. They know it as certainly as you know black from white or night from day."

Tor put in, "Which is an additional reason why we're not very popular. Skin trouble's the basic one, d'you understand? So among an appalling mixture of hostile smells we welcome an occasional friendly one—as yours is."

"Do the Dranes smell friendly?"

Tor pulled a face. "They stink!" he said with much emphasis. Gazing ruminatively at the blank television screen, he went on, "Well, the powers-that-be are after your earthly body, and I'm afraid we can't offer you much encouragement though we're willing to give you all the help we can. Something like twenty specimens have escaped in the last ten or twelve years. All of them broke loose by suddenly displaying long-concealed and quite unexpected powers which caught their captors by surprise. But none stayed free. One by one they were roped in, some sooner than others.

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You can't use your strength without revealing what you've got, and once the authorities know what you've got they take steps to cope with it. Sooner or later the fugitive makes a try for his home planet—and finds the trappers waiting."

"They're going to have a long, long wait," Harold told him, "for I'm not contemplating a return to my home world. Leastways, not yet. What's the use of coming all the way here just to go all the way back again?"

"We took it that you hadn't much choice about the coming," said Tor.

"Nor had I. Circumstances made it necessary for me to come. Circumstances make it necessary for me to stay awhile."

The three were mildly surprised by this phlegmatic attitude.

"I'm more of a nuisance here," Harold pointed out. "This is the Empire's key planet. Whoever bosses this world bosses the Empire. It may be one man, it may be a small clique, but on this planet is the mind or minds which make the Empire tick. I'd like to retime that tick."

"You've *some* hopes!" opined Tor gloomily. "The Big Noise is Burkinshaw Three, the Lord of Terror. You've got to have forty-two permits, signed and countersigned, plus an armed escort, to get within sight of him. He's exclusive!"

"That's tough, but the situation is tougher." He relaxed in his chair and thought awhile. "There's a Lord of Terror on every planet, isn't there? It's a cockeyed title for the bosses of imperial freedom!"

"Terror means greatness, superior wisdom, intellect of godlike quality," explained Tor.

"Oh, does it? My mistake! We use the same-sounding word on my planet, and there it means fear." Suddenly a strange expression came into his face. He ejaculated, "Burkinshaw! Burkinshaw! Ye gods!"

"What's the matter?" Melor inquired.

"Nothing much. It's only that evidence is piling up on top of a theory. It should help. Yes, it ought to help a lot." Getting up, he paced the room restlessly. "Is there an underground independence movement on Linga?" he asked.

Tor grinned with relish, and said, "I'd not be far from the truth if I guessed that there's such a movement on every planet excepting this one. Imperially speaking, we're all in the same adolescent condition: not quite ripe for self-government. We'll all get independence tomorrow, but not today." He heaved a resigned sigh. "Linga's been getting it tomorrow for the last seven hundred years."

"As I thought," Harold commented. "The same old set-up. The same old stresses, strains and inherent weaknesses. The same blindness and procrastination. We've known it all before—it's an old, old tale to us."

"What is?" persisted the curious Melor.

"History," Harold told him.

Melor looked puzzled.

"There's an ancient saying,"

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Harold continued, "to the effect that the bigger they come the harder they fall. The more ponderous and top-heavy a structure the riper it is for toppling." He rubbed his chin, studied his listeners with a peculiarly elfish gaze. "So the problem is whether we can shove hard enough to make it teeter."

"Never!" exclaimed Tor. "Nor a thousand either. It's been tried times without number. The triers got buried—whenever there was enough to bury."

"Which means that they tried in the wrong way, and/or at the wrong time. It's up to us to push in the right way at the right time."

"How can you tell the right time?"

"I can't. I can choose only the time which, when everything's taken into account, seems the most favorable—and then hope that it's the right time. It'll be just my hard luck if I'm wrong." He reflected a moment, then went on, "The best time ought to be nine days hence. If you can help me to keep under cover that long, I'll promise not to involve you in anything risky in the meanwhile. Can you keep me nine days?"

"Sure we can." Tor regarded him levelly. "But what do we get out of it other than the prospect of premature burial?"

"Nothing except the satisfaction of having had a finger in the pie."

"Is that all?" Tor asked.

"That's all," declared Harold positively. "You Lingans must fight your way as we're fighting ours. If ever my people help you, it will be for the sake of mutual benefit or our own satisfaction. It won't be by way of reward."

"That suits me." Tor said flatly. "I like good, plain talk, with no frills. We're tired of worthless promises. Count us with you to the base of the scaffold, but not up the steps—we'd like to indulge second thoughts before we mount those!"

"Thanks a lot," acknowledged Harold gratefully. "Now here are some ideas I've got which—"

He stopped as the television set emitted a loud chime. Tor reached over, switched on the apparatus. Its screen came to life, depicting the same uniformed sourpuss as before.

The official rumbled, "Urgent call! Citizens are warned that the escaped specimen Harold Harold-Myra, for whom a call was broadcast half an hour ago, is now known to be a telepath, a mesman, a seer and a recorder. It is possible that he may also possess telekinetic powers of unknown extent. Facts recently brought to light suggest that he's a decoy and therefore doubly dangerous. Study his likeness; he must be brought in as soon as possible."

The screen blanked, lit up again, showed Harold's face for a full minute. Then the telecast cut off.

"What does he mean, a seer and a recorder?" inquired Harold, mystified.

"A seer is one who makes moves in anticipation of two, three, four or more of his opponent's moves. A chessmaster is a seer."

"Heavens, do they play chess here, too?"

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"Chess is popular all over the Empire. What of it?"

"Never mind," said Harold. "We'll stick the fact on top of the pile. Go on."

"A recorder," explained Tor, "is someone with a photographic memory. He doesn't write anything down. He remembers it all, accurately, in full detail."

"Humph! I don't think there's anything extraordinary about that."

"We Lingans can't do it. In fact, we know of only four life forms that can." Respect crept into Tor's snake-skinned face. "And do you really have telekinetic power as well?"

"No. It's a false conclusion to which they've jumped. They appear to think I'm a poltergeist or something—goodness only knows why." He mused a moment. "Maybe it's because of that analysis in stage three. I can control my heart beats, my blood pressure, my thoughts, and I made their analytical apparatus go haywire. They can get out of it nothing but contradictory nonsense. Evidently they suspect that I sabotaged its innards by some form of remote control."

"Oh!" Tor was openly disappointed.

Before any of them could venture further remark, the television set called for attention and Sourpuss appeared for the third time.

"All nonnative citizens will observe a curfew tonight from midnight until one hour after dawn," he droned. "During this period the police may call at certain apartments. Any nonnative citizens found absent from their apartments and unable to give satisfactory reason therefor, or any nonnative citizens who obstruct the police in the execution of their duty, will be dealt with in accordance with pan-planetary law." He paused, stared out of the screen. He looked bellicose. "The fugitive, Harold Harold-Myra, is in possession of identity card number AMB 307-40781, entered in the name of Robertus Bron. That is all."

"Bron," echoed Harold. "Bron . . . Burkinshaw . . . chessmasters. Dear me!"

The three Lingans were apprehensive, and Melor ventured, "You can see their moves. One: they're satisfied that by now you've found a hiding place. Two: they know you're hiding with outsiders and not with natives. Since there aren't more than sixty thousands of outsiders on this planet, sharing one third that number of apartments, it's not impossible to pounce on the lot at one go." His forehead wrinkled with thought. "It's no use you fleeing elsewhere because this curfew is planet-wide. It covers everywhere. I reckon your easiest way out would be to hynotize a native and stay in his apartment overnight. If, as they say, you're a mesman, it should be easy."

"Except for one thing."

"What is that?"

"It's what they expect me to do. In fact, it's what they're trying to make me do."

"Even so," persisted Melor, "what's to stop you?"

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"The routine. A master race always has a routine. It's drilled into them; it's part of their education. Having been warned that a badly wanted specimen is on the loose and about to bolt, they will take the officially prescribed precautions." He grinned at them reassuringly, but they didn't derive much comfort from it. "I can only guess what that routine will be, but I reckon it'll include some method of advertising my presence in a native's apartment even though its occupant is helpless. Scanners coupled to the Police Emergency system and switched in by the opening of a door, or something like that. When I take risks, I pick my own. It's asking for trouble to let the opposition pick 'em for you."

"Maybe you're right," agreed Melor. "We do know that local people have certain facilities denied to outsiders."

"Now if a couple of cops come along to give this place a look over, and I take control of their minds and send them away convinced that I'm just another Lingan, the powers-that-be will have been fooled, won't they?"

"I hadn't thought of that," put in Tor. He was disgusted with his own lack of imagination. "It was so obvious that I didn't see it."

"So obvious," Harold pointed out, "that the authorities know that's just what would occur should they find me here."

"Then why the curfew and the search?"

"Bluff!" defined Harold. "They hope to make me move or, failing that, put scare into those harboring me. They're banging on the walls hoping the rat will run. I won't run! With your kind permission, I'll sit tight."

"You're welcome to stay," Tor assured. "We can find you a spare bed, and if you—"

"Thanks!" Harold interrupted, "but I don't need one. I don't sleep."

"You don't!" They were dumfounded.

"Never slept a wink in my life. It's a habit we've abandoned." He walked around the room, studying its fittings. "Impatience is the curse of plotters. Nothing bores me more than waiting for time to ripen. I've simply got to wait nine days. Are you really willing to put up with me that long or, if not, can you find me some place else?"

"Stay here," said Tor. "You repay us with your company. We can talk to each other of homes beyond reach. We can talk about the freedom of subject peoples and of things it is not wise to discuss outside. It is sweet to dream dreams. It is good to play with notions of what one might do if only one could find a way to do it."

"You're a little pessimistic," gibed Harold.

On the fourth day his idleness became too much to bear. He went out, strolled along the streets of the city. Two more irate broadcasts had advertised his extended liberty, but the last of them had been three days before. Since then, silence.

His trust reposed in the inability

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of the public to remember that morning's broadcast, let alone the details of the twentieth one before it, and his confidence was not misplaced. People wandered past him with vacant expressions and preoccupied minds. In most cases, their eyes looked at him without seeing him. In a few cases, his features registered, but no significance registered with them. The farther he walked, the safer he felt.

Downtown he found a smart, modernistic store well stocked with scientific instruments. This simplified matters. He'd been trying to solve the problem of how to get Melor to shop for him without using this silly stuff called money. The Lingan's respect for it equalled his own contempt for it, therefore he couldn't ask his hosts to spend their own on his behalf. Instinct rather than deliberate reasoning had made him recognize this simple ethic of a moneyed world.

Boldly entering the store, he examined its stock. Here were some things he wanted, others capable of ready adaption to what he desired. Different cultures evolved differing modes of manufacture. Conventional jobs would need alteration to become conventional according to his other-worldly notions, but the simplest tools would enable him to deal with these. Making a list of his requirements, he prowled around until it was complete, handed it to a salesman.

The latter, a shrewd individual, looked the list over, said sharply, "This stuff is for microwave radiation."

"I know it," said Harold blandly.

"It is not for sale to the public except on production of an official permit," he went on. Then, stiffly, "Have you such a permit? May I see your identity card?"

Harold showed him the card.

"Ah!" mouthed the salesman, his manner changing, "the police!" His laugh was apologetic and forced. "Well, you didn't catch me disregarding regulations!"

"I'm not trying to catch you. I've come to get some necessary equipment. Pack it up and let me have it. I'm on urgent business and in a hurry."

"Certainly, certainly." Bustling to and fro, anxious to placate, the salesman collected the equipment, packaged it. Then he made careful note of the name and number on Harold's identity card. "We charge this to the Police Department, as usual?"

"No," Harold contradicted. "Charge it to the Analysis Division of the Immigration Department, Stage Three."

He had a satisfied smile as he went out. When the Bearded One got the bill he could stick it in his analyzer and watch the meters whirl. Which reminded him now that he came to think of it—there didn't seem to be an overmuch sense of humor on this world.

Safely back in the Lingans' apartment, he unloaded his loot, got started on it. His hosts were out. He kept the door locked, concentrated on his task and progressed with speed and dexterity which would have astounded his former

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captors. When he'd been at work an hour the set in the corner chimed urgently, but he ignored it and was still engrossed in his task when the Lingans came in some time later.

Carefully closing and fastening the door, Melor said, "Well, they've got worried about you again."

"Have they?"

"Didn't you catch the recent broadcast?"

"I was too busy," explained Harold.

"They've discovered that you've got a police card and not the card they first announced. They broadcast a correction and a further warning. The announcer was somewhat annoyed."

"So'd I be," said Harold, "if I were Sourpuss."

Melor's eyes, which had been staring absently at the litter of stuff on which Harold was working, suddenly realized what they saw.

"Hey, where did you get all that?" he asked, with alarm. "Have you been outdoors?"

"Sure! I had to get this junk somehow other and I couldn't think of how to get it any other way. I couldn't wish it into existence. We've not progressed quite *that* far—yet!" He glanced at the uneasy Lingan. "Take it easy. There's nothing to worry about. I was out for less than a couple of hours, and I might have been born and bred in this city for all the notice anyone took of me."

"Maybe so." Melor flopped into a chair, massaged his scaly chin. Ripples of underlying blueness ran through it as his skin moved. "But if you do it too often you'll meet a cop, or a spaceman, or a Drane. Cops are too inquisitive. Spacemen recognize outsiders and rarely forget a face. Dranes know too much and can divine too much. It's risky." He looked again at the litter of apparatus. "What're you making, anyway?"

"A simple contactor."

"What's that for?"

"Making contact with someone else." Harold wangled an electric iron into the heart of the mess, deftly inserted a condenser smaller than a button, linked it into the circuit with two dabs of solder. "If two people, uncertain of each other's whereabouts, are seeking each other within the limits of the same horizon, they can trace each other with contactors."

"I see," said Melor, not seeing at all. "Why not make mental contact?"

"Because the telepathic range is far too short. Thoughts fade swiftly within distance, especially when blanketed by obstacles."

The three were still watching him curiously when he finished the job shortly before midnight. Now he had a small transmitter-receiver fitted with three antennae, one being a short, vertical rod, the second a tiny silver loop rotatable through its horizontal plane, the third a short silver tube, slightly curved, also rotatable horizonally.

"Now to tune it up," he told them.

Connecting the set-up to the power supplies, he let it warm

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through before he started tuning it with a glassite screwdriver. It was a tricky job. The oscillatory circuit had to be steered a delicate margin past peak so that it would swing dead on to resonance when hand-capacity was removed. And, strangely enough, hand-capacity was greater on this planet. The correct margin had to be discovered by trial and error, by delicate adjustment and readjustment.

He manipulated the tuning with fingers as firm and sensitive as any surgeon's. His jawbone ached. Tuning the set onward, he took his hand away. The circuit swung short. He tried again and again. Eventually he stood away from the apparatus, rubbed his aching jaw in which dull pain was throbbing, switched off the power.

"That'll do," he remarked.

"Aren't you going to use it now?" Melor inquired.

"I can't. Nobody's looking for me yet."

"Oh!" The trio were more puzzled than ever. They gave it up and went to bed.

Putting away his apparatus, Harold dug a book on ancient history out of the Lingans' small but excellent library, settled himself down to the fourth successive night of self-education. There was dynamite in these books for those who had eyes to see. No Lord of Terror had seen them in the light in which he saw them!

The ninth day dawned in manner no different from any other. The sun came up and the Empire's boss city stirred to officially conducted life.

When Melor appeared, Harold said to him, "I believe that this is your free day. Have you any plans for it?"

"Nothing important. Why?"

"The fun starts today, or ought to start if my calculations are correct. I could do with your help."

"In what way?"

"You're going to be mighty useful if I come up against someone who can control his thoughts or shield them entirely. Hatred or animosity aren't thoughts—they're emotions of which antagonistic thoughts are born. You Lingans respond to such emotions. You can go on reading the heart long after the mind is closed to me."

"I get the point but not the purpose," confessed Melor.

"Look," said Harold patiently, "when I say the fun starts I don't mean that there's going to be wholesale violence. We've found better ways. It's possible, for instance, to talk oneself into anything or out of anything provided one says the right things to the right person at the right time. The waving blade hasn't half the potency of the wagging tongue. And the tongue isn't messy." He smiled grimly. "My people have had more than their fill of messy methods. We don't bother with them these days. We're grown up."

"So?" prompted Melor.

"So I need you to tell me how I'm doing if, mayhap, I'm working on someone with a closed mind."

"That's easy. I could tell you

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when hatred, fear or friendliness intensifies or lessens by one degree."

"Just what I need," enthused Harold. "My form of life has its shortcomings as well as its talents, and we don't let ourselves forget it. Last time some of us forgot it, the forgetters thought themselves a collective form of God. The delusion bred death!"

His tongue gently explored a back tooth as his gaze went to the transmitter-receiver waiting at one side of the room.

Nothing happened until midday. The two kept company through the morning, the fugitive expectant and alert, his host uneasy and silently speculative. At noon the television set chimed and Melor switched it on.

Helman came on the screen. He stared straight at the watching pair in manner suggesting that he saw them as clearly as they saw him. His dark features were surly.

"This is a personal broadcast for the benefit of the specimen known at Harold Harold-Myra," Helman enunciated, "or to any citizen illegally maintaining contact with him. Be it known, Harold Harold-Myra, that a summary of all the available data on your world type has been laid before the Council of Action, which Council, after due consideration thereof, has decided that it is to the essential interest of the Empire that your life form be exterminated with the minimum of delay. By midday tomorrow an order will be sent to appropriate war vessels requiring them to vaporize your native planet—unless, in the meantime, you have surrendered yourself and provided new evidence which may persuade the Council of Action to reconsider its decision."

Helman stopped, licked his lips. His air was that of one still nursing a severe reprimand.

He went on, "This notification will be rebroadcast in one hour's time. Watchers in touch with the fugitive are advised to bring it to his attention as this will be the last warning." His surliness increased as he finished, "In the event of his prompt surrender, the Council of Action will extend gracious pardon to those who have been harboring this specimen."

The screen blanked.

"Mate in one move," said Melor glumly. "We told you that it was a waste of time to sit and plot. They get 'em all, one way or another.

"It's check—and your move."

"All right then—what's your move?"

"I don't know yet. We've still got to wait. If you sit by the chimney long enough, Santa Claus comes down."

"In the name of the Blue Sun, who is Santa Claus?" asked Melor peevishly.

"The man with a million lollies."

"Lollies?"

"Things you lick."

"Oh, cosmos!" said Melor. "What madman wants to own a million things to lick? Is this anything to do with your sermon about wagging tongues? If so, *we're* licked!"

"Forget it," Harold advised. "I talk in riddles to pass the time."

A pain suddenly pulsed in his

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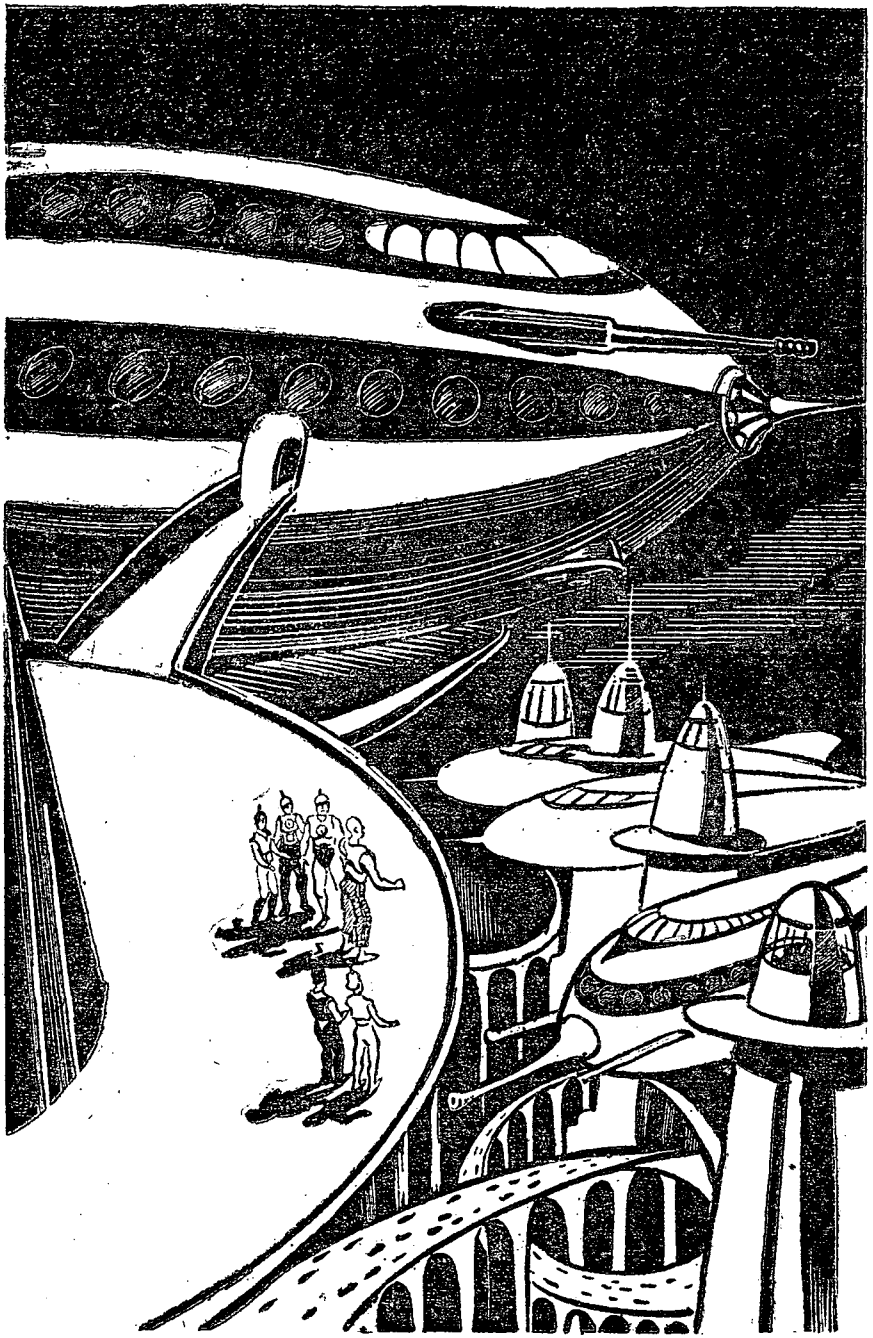

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jawbone. It brought an exclamation from him which stirred the nervous Melor. Putting two fingers into his mouth, Harold unscrewed the crown of a back molar, took it out, put it on the table. A tiny splinter of crystal glittered within the base of the crown. The crystal was fluorescent. Melor gaped at it fascinatedly.

Swiftly powering the transmitter-receiver, Harold let it warm up. A faint, high-pitched whistle crept into its little phone. He swung the loop slowly while the whistle strengthened, then weakened, finally faded out. Slightly offsetting the loop to bring back the signal, he pressed a stud. The note grew stronger.

"That side," he murmured, indicating the face of the loop nearest to the watching Melor.

Returning the loop to fade-out position, he switched in the transmitter, swung its curved tube antenna until it paralleled the direction faced by the receiver's loop. Again he offset the loop, and the signal returned. He waited expectantly. In a little while, the signal broke into three short pips then resumed its steady note. He flipped his transmitter switch three times.

For half an hour the two sat and waited while the whistle maintained itself and gave triple pips at regular intervals. Then, suddenly, it soared up in power and gave one pip.

Carefully, Harold repeated all the rigmarole with the antenna, this time obtaining a different direction. Three pips came as his reward, and again he switched his transmitter in acknowledgment. Another long wait. Then, slowly, weakly and distantly, a voice crept into his mind.

"A blue car. A blue car."

Going to the window, he looked down into the street. From his height of ten floors he had a clear view extending several blocks in both directions. He found a score of automobiles on the street, half a dozen of them blue.

"Stop, step out, get in again," he thought. He repeated the mental impulse, driving it outward with maximum intensity.

A car stopped, a human shape got out, looked around, stepped back into the vehicle. It was a blue car.

Harold crossed the room, disconnected the contactor, and returned to the window. Looking downward, he thought powerfully.

"I believe I've got you. Drive on slowly . . . slowly . . . here you are . . . stop there! The building immediately on your right. Ten floors up."

He continued to keep watch as the car pulled in by the opposite sidewalk. Two men emerged from it, crossed the road with casual nonchalance, disappeared beneath him. No other cars halted, nobody followed the men into the building.

A voice reached him strongly, *"Are we dragging anything?"*

"Not that I can see."

"Good!"

Melor said plaintively, "I know that you're communitcating with someone. Santa Claus, I presume? How you can read each other's toothache is a mystery to me."

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"Our throbs are no worse than your wobbles."

"You bounce around," said Melor, "and, according to you, we dither. Some day we'll come across some other life form which spins around in circles, like a mental dervish. Or even an entity capable of logical reasoning without thought at all; a sort of Bohr-thinker who skips straight from premise to conclusion without covering the intervening distance." His eyes found the crystal still on the table, noted that it had ceased to glow. "Better plant your key-frequency back in your face before somebody sets it in a ring."

Harold smiled, took up the crystal, screwed it back into place. Opening the door, he looked out just as the pair from the car arrived on the landing. He beckoned them in, locked the door behind them, introduced them to the Lingan.

"This is Melor, a friend from Linga. Melor, meet George Richard-Eve and Burt Ken-Claudette."

Melor looked askance at the newcomers' neat space uniforms and the silver comet insignia glittering on their epaulettes. He commented, "Well, they smell as good as they look bad. You'll produce a pally Drane next!"

"Not likely!" Harold assured.

Burt sat down, said to Harold, "You know the locals by now. Are they crafty enough to have drawn a bead on that transmission and, if so, how long d'you think they'll give us? If time's short, we can beat it in the car and delay matters a little."

"They know how I got the stuff, where I got it, and its purpose, and they're not too dopey to listen out," Harold replied. "As I guess, I give them half an hour."

"That'll do."

Melor put in, "Talk mentally if it suits you better. I don't mind."

"You're in this," Harold told him, "so we'll talk vocally. You're entitled to listen." He turned to Burt. "What's cooking?"

"There's fun and games on four out of the five. The fth proved useless for our purpose: it held nothing but a few time-serving bureaucrats on high pay. But four should do, I reckon."

"Go on."

"All the appointed ones have gone beyond and the first of them ought to have reached their destinations by now. It's six days to the nearest system, so they've a good margin." He smoothed his dark hair, looked reminiscent. "*Nemo* is due to pop off any moment now. That was a tough job! We took forty people off it, but had to scour the place from end to end to find the last pair of them. We got 'em, though. They've been dumped in safety."

"Good!"

"This has been an education," Burt went on. "Better than going to the zoo. There's an underground message system on number three, for instance, which has to be seen to be believed. By 'underground' they mean ten thousand

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feet up! How d'you think they do it?"

"I've no idea," said Harold.

"With birds! Among the minority life forms there is one which is beaked and feathered. They talk with birds. They chirrup and squawk at them, and every bird understands what's said."

"Orniths," informed Melor. "They came originally from Gronat, the Empire's eight hundredth conquest. They're scattered around and there are a few of them here, maybe a dozen or so. When you've had time to tour the Empire you'll find it contains even stranger forms. And the humanoids don't even dislike them all."

"It would seem that the humanoids don't even like each other much," Burt commented. "To most of them, a brother from a neighboring planet is a foreigner."

"Still in the schoolkid stage," said Harold. "Rah-rah and all that."

Burt nodded and continued, "As you know, we've had to move too fast in too little time to put over anything really drastic, but what's been done ought to be enough to show what could be done—which is all that matters." A faraway look came into his eyes. "When we triumphantly cast our bread upon the waters we little thought it'd come back—all wet."

"So you've found confirmation of that?"

"Plenty," Burt replied. "Have you?"

"Any amount of it." Harold went to the bookshelf, selected a heavy tome titled "The Imperial Elect." He skimmed through its pages, found an illustration, showed it to Burt. "Look!"

"Phew!" said Burt.

"The Budding Cross," breathed George, looking over Burt's shoulder. "And the Circle of Infinity!"

"That shelf is crammed with stuff," Harold told them as he replaced the book, "I've been going through it like a man in a strange dream." He came back, sat down. "Anything more to report?"

"Not much. Jon has stayed on number three. He had a stroke of luck and got at the Lord, a fat personage named Amilcare. Temporarily, His Eminence doesn't know which shoe is on which foot."

Harold opened his mouth to comment, closed it without saying anything. His mental perception perked up, listened intently. Burt and George listened likewise. Melor began to fidget. For the first time, Harold noticed that a fringe of fine hairs lay along the rims of the Lingan's ears, and that these hairs were now fully extended and quivering.

"There's a stink of hostility," complained Melor uneasily. In his lithe, loose-jointed gait, he went to the window.

A hubbub lay across the ether, a confused mixture of thoughts from which it was impossible to extract more than odd, disjointed phrases.

"Line 'em across that end . . . rumble, rumble . . . yes, take the ground floor . . . rumble, buzz, buzz

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. . . work upward . . . rumble . . . ten of you . . . look out for . . . rumble . . . they may be . . ."

"I expect visitors," remarked George, easily. He joined Melor at the window.

The others followed, and the four looked down at the street. It was a hive of activity. A dozen cars were drawn across one end, blocking it completely. Another dozen jockeyed for position to block the opposite end. Cars plugged the three side streets in between. Something invisible droned steadily overhead; it sounded like a squadron of helicopters. More than two hundred black-uniformed men were scattered along the sidewalk in little groups.

"Their bearings must have been rough." Burt pulled a face at the cohort below. "It got them this section of the street but not the building. I'd be ashamed of such a sloppy job."

"It's good enough," Harold answered. He filtered the telepathic surge once again. It was entirely human, involuntary and nonreceptive. "We could go down and save them some bother, but I'm a bit curious about those butterfly minds down there. Surely they'd have brought something potent along with them."

"Test it," suggested Burt.

Dropping their mental shields, the three let their thoughts flow forth bearing a perfect picture of their location. Instantly the hubbub was overwhelmed by an alien mind which imposed itself upon the ether. It was clear, sharp, penetrating, and of remarkable strength.

"They're in that building there! Ten floors high! Three of them and a Lingan. They contemplate no resistance!"

"A Drane!" said Harold.

It was impossible to locate the creature amid the mass of men and automobiles beneath, neither could he sense its general direction for, having said all it considered essential, it had closed its mind and its powerful impulse was gone.

"Judging by the throb, there was a Drane down there," offered Melor belatedly. "Did you hear it? I couldn't understand what it said."

"It got us fixed. It identified your erratic thought-flow and said that a Lingan was with us."

"And what are we going to do about it? Do we stand like sheep and wait to be taken away?"

"Yes," Harold informed.

Melor's face registered approaching martyrdom, but he offered no further remark.

There wasn't an immediate response to the Drane's revelation. For reasons unknown to the watchers, a short time-lag intervened. It ended when a car roared along the street with a silver-spangled official bawling orders from its side window. As one man, the uniformed clusters made a determined rush for the front entrance of the building.

It was Melor who opened the door and admitted a police captain and six men. All seven wore the strained expressions of people

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called upon to deal with things unimaginable, and all seven were armed. Little blasters, similar to the one Harold had found so objectionable, were ready in their hands.

The captain, a big, burly man, but pale of face, entered the room with his blaster held forward, and gabbled hastily through his prepared speech.

"Listen to me, you four, before you try any tricks. We've reversed the controls on these guns. They stay safe while they're gripped but go off immediately our hands loosen —and hypnosis causes involuntary relaxation of the muscles which you can't prevent!" He swallowed hard. "Any clever stunts will do no more than turn this place into a shambles. In addition, there are more men outside, more on every floor, more in the street. You can't cope with the lot!"

Smiling amiably, Harold said, "You tempt us to persuade you to toss those toys out of the window, and your pants after them. But we want to talk to the Council of Action and have no time for amusement. Let's go."

The captain didn't know whether to scowl or look relieved. Cautiously he stood to one side, his gun held level, as the four filed out through the door. The escorts were equally leery. They surrounded the quartet, but not too closely, bearing themselves with the air of men compelled to nurse vipers to their bosoms.

As they marched along the landing toward the levitators Burt nudged the nearest guard and demanded, "What's your name?"

The fellow, a lanky, beetle-browed individual, was startled and apprehensive as he answered, "Walt Bron."

"Tut!" said Burt.

The guard didn't like that *"tut."* His brows came down, his small eyes held a stupefied expression as his mind said to itself, *"Why should he want my name? Why pick on me? I ain't done him any harm. What's he up to now?"*

Burt smiled broadly and his own mind reached out to George's and Harold's, saying, *"Something has got them worried, though the higher-ups aren't likely to have told them much."*

"Yes—it looks as if there's irritation in influential circles and the cops got bawled out in consequence. Evidently news is coming through." Pause. *"Did you feel any probe?"*

"No."

"Neither did we. That Drane must have gone." Pause. *"Pity we can't talk with Melor this way. He's walking behind like a fatalist pacing to certain death."* Pause. *"Got plenty of guts, the way he's taken us on trust."*

"Yes—but we'll look after him!"

They reached the levitators. The entire landing was now solid with armed police and a number of them were pressing eagerly into the deserted apartment, intent on thorough search.

Herded into a levitator, the captured quartet and their escort of seven crammed it to capacity. The glassite doors slid shut. The burly

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captain pressed a button and the levitator soared smoothly upward while its occupants watched the rising indicator with offhand interest. They stopped at the twenty-seventh floor.

The captain didn't permit the doors to open. He stood with his attention fixed upon the indicator while slowly his beefy face changed color. Suddenly, he rammed his big thumb on the ground-level button and the levitator shot downward.

Harold: *"Who did that?"*

Burt: *"Me. I couldn't resist it."*

Then, vocally, and loudly, "I didn't notice any guns go off. Did you?"

The other captives grinned. The captain glared at the up-flying shaft but said nothing. The escort's uneasiness registered more openly on their faces.

A veritable guard of honor had lined up between the front entrance and the waiting car. About sixty guns were held in readiness on either side—in flat disregard of the fact that one had only to start something and let the fire of one rank bring down half the opposite rank, thus providing plentiful company in death.

The four got into the car, and its driver, a thin featured, pessimistic individual, looked even less happy for their arrival. He had a cop for company in front. The car blew its jets and started off with half a dozen cars leading and a full dozen following. It was a cavalcade worthy of the year's best burial, and its pace was suitably funereal as it wended its way through a succession of side streets to the outskirts of the city. A thousand feet above them a helicopter and two gyros drifted along, carefully following every bend and turn on their route.

The destination proved to be an immense, needlelike skyscraper, tall, slender, graceful. It soared majestically from spacious, well-tended grounds around which stood a high wall surmounted by the spidery wiring of a photoelectric telltale system. As they swept through the great gateway, the prisoners caught a glimpse of the telltale marker-board in the granite lodge and a group of heavily armed guards lounging behind the gates.

"The palace of the Council," Melor informed. "This is where they make worlds and break them—or so they claim."

"Be quiet!" snapped the cop in front. Then, in a high, squeaky voice, he added, "There are fairies at the bottom of my garden!"

"Indeed?" said Burt, affecting polite surprise.

The cop's sour face whitened. His grip tightened on his blaster, forgetting in his emotion that a stronger hold was supposed to be ineffective.

"Let him alone, Burt!" thought Harold.

"I don't like him," Burt came back. *"His ears stick out."*

"How he smells of fury!" criticized Melor, openly.

Conversation ended as the procession halted in front of the skyscraper's ornate entrance. The

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quartet climbed out, paraded through another wary guard of honor, entered the building. Here, more black-uniformed men conducted them two levels below ground, ushered them into an apartment which, ominously, had a beryllium-steel grille in lieu of a door. The last man out turned a monster key in the grille and departed.

Before the inmates had time thoroughly to examine their new prison, an attendant appeared, thrust packaged foods through the bars of the grille, and told them, "I haven't got the key and don't know who has. Neither can I find out. If you want anything, call for me, but don't think you can make me open up. I couldn't do it even if I wanted—which I don't!"

"Dear me," said Burt, "that's unkind of you." Going to the grille, he swung it open, looked out at the astounded attendant and continued, "Tell the Council that we are very comfortable and appreciate their forethought. We shall be pleased to call upon them shortly."

The attendant's scattered wits came together. He took to his heels as if the breath of death was on his neck.

"How did you do that?" demanded Melor, his eyes wide. He ambled loose-jointedly to the grille, looked at its lock, swung it to and fro on its hinges.

"The gentleman with the key locked it, then unlocked it, and wandered away satisfied that duty had been done," Burt released a sigh. "Life is full of delusions." Opening a packet, he examined its contents. "Calorbix!" he said disgustedly, and tossed the package on a table.

"Here they come," George announced.

A horde arrived. They locked the grille, put two heavy chains around its end post, padlocked those. The four watched in amused silence. A pompous little man, with much silver braid strewn over his chest, then tried the grille, shaking it furiously. Satisfied, he scowled at the four, went away, the horde following.

Burt mooched restlessly around the room. "There are scanners watching us, microphones listening to us and, for all I know, some cockeyed gadget tasting us. I'm fed up with this. Let's go see the Council."

"Yes, it's about time we did," George agreed.

"The sooner the better," added Harold.

Melor offered no comment. The conversation of his friends, he decided, oft confusing and seemingly illogical. They had a habit of going off at the queerest slants. So he contented himself with staring at the grille through which nothing but some liquid form of life could pass, while he wondered whether Tor and Vern had yet been dragged into the net. He hoped not. It was better to execute one Lingan than three.

A minute later the man with the keys came back accompanied by two guards and a tall, gray-haired official clad in myrtle green. The badge of the Silver Comet glittered

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on the latter's shoulder straps. His keen gaze rested on the warden as that worthy surlily unlocked the padlocks, withdrew the chains, freed the grille.

Then he said to the four, "Most remarkable!" He waited for a response, but none came, so he carried on. "This warder hasn't the least notion of what he's doing. As the Council expected, you influenced him to return and unlock the gate. We kept him under observation. It has been an interesting demonstration of what hypnosis can achieve." His smile was amiable. "But you didn't expect him to return accompanied, eh?"

"What does it matter?" Harold answered. "Your brain advertises that the Council is ready to deal with us."

"I waste my breath talking." The official made a gesture of futility. "All right. Come with me."

The Council looked small. Its strength a mere eight, all but two of them human. They sat at a long table, the six humans in the middle, a nonhuman at each end. The thing on the extreme right had a head like a purple globe, smooth, shining, hairless, possessing no features except a pair of retractable eyes. Below was a cloaked shapelessness suggesting no shoulders and no arms. It was as repulsive as the sample on the left was beautiful. The one on the left had a flat, circular, golden face surrounded by golden petals, large and glossy. The head was supported by a short, fibrous green neck from the knot of which depended long, delicate arms terminating in five tentacles. Two black-knobbed stamens jutted from the face, and a wide, mobile mouth was visible beneath them. It was lovely, like a flower.

Between this table and the staring captives hung a barrier of wire. Harold, Burt and George could *see* that it was loaded, and their perceptions examined it gingerly. They diagnosed its purpose simultaneously: it bore an alternating current imposed upon a pulsing potential. Two hundred cycles per second, with a minimum pressure of four thousand volts rising to peak points of seven thousand every tenth cycle.

"*Hypnocast jammer!*" reported Burt. He was puzzled. "But that doesn't blank neural sprays. They're different bands. Can you hear what they're thinking?"

"Not a thing," answered Harold. "Neither could I get your thoughts while you were speaking."

"I've lost contact, too," put in George. "Something which isn't that screen is droning out a bass beat note that makes a mess of the telepathic band."

Sniffing with distaste, Melor said, "This is where I come in. I know what's the matter. There's a Drane in the room. He's doing it."

"Are you sure of that?"

"I can sense him." He pointed at the flowerlike being on the left. "Furthermore, Dranes can't speak. They've no vocal cords. The

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Florans function as their interpreters—that's why this one's here."

One of the humans on the Council, a bull-headed, heavily jowled man, leaned forward, fixed glittering eyes on the four. His voice was harsh.

"The Lingan is right. Since we are not assembled to be entertained by your alien antics, nor to listen to your lies, but solely for the purpose of weighing fresh truths with justice and with wisdom, we find it necessary to employ a Drane."

So saying, he made a dramatic gesture. The Floran reached a tentacled hand down behind the table, lifted the hidden Drane, placed it on the polished surface.

Mental visualization, Harold realized, had proved correct with regard to shape and appearance but had misled him in the matter of size. He'd taken it for granted that a Drane possessed bulk comparable with his own. But this creature was no larger than his fist. Its very smallness shocked him.

It was lizardlike, but not so completely as first appeared, and now that he could see it closely, its tiny but perfect uniform looked absurd. While they regarded it, the thing sat there and stared at them with eyes like pin points of flaming crimson, and as it stared the strange beat note disappeared, a psychic flood poured through the screen and lapped around their minds.

But already the three shields were up, while the fourth—the Lingan—felt the force only as an acute throb. The pressure went up and up; it was amazing that such a midget brain could emit so mighty a mental flow of power. It felt and probed and thrust and stabbed, its violence increasing without abate.

Perspiration beaded the features of the trio as they gazed fixedly at the same spot on the Drane's jacket while maintaining their shields against its invisible assault. Melor sat down, cradled his head in his arms, began to rock slowly from side to side. The Council watched impassively. The Drane's optics were jewels of fire.

"Keep it up," whispered Harold. "It's almost on the boil."

Like the lizards it resembled, the Drane's pose was fixed, unmoving. It had remained as motionless as a carved ornament since it had reached the table, and its baleful eyes had never blinked. Still its psychic output went up.

Then, suddenly, it pawed at its jacket, snatched the paw away. A thin wisp of smoke crawled out of the cloth. The next instant, the creature had fled from the table, the mental pressure collapsing as its source disappeared. Its sharp, peaky voice came into their minds as the thing snaked through a tiny door, fled along the outer passage. The voice faded with distance.

"Burning . . . burning . . . burning!"

The Council member who had spoken originally, now sat staring through the screen at the prisoners. His hand was on the table,

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and his fingers rapped its surface nervously. The other members maintained blank expressions. He turned his head, looked at the Floran.

"What happened?"

"The Drane said he was burning," enunciated the mouth in the flowerlike head. Its tones were weak, but precise. "His mind was very agitated. The peril destroyed his ability to concentrate, and he had to flee lest worse befall."

"Pyrotics!" said the Council member incredulously. "There are legends of such." His attention returned to the captives. "So you're pyrotics—fire-raisers!"

"Some of your people can do it—but don't know it themselves," Harold told him. "They've caused most of any seemingly inexplicable fires you've experienced." He made a gesture of impatience. "Now that we've got rid of that Drane how about giving way to what's on your mind? We can read what is written there, and we know the next move: you're to call Burkinshaw, Helman and Roka, after which the parley will start."

Frowning, but making no retort, the Council member pressed a red button on his desk. His attitude was one of expectancy.

In short time, Helman and Roka entered the room, took seats at the table. The former's bearing was surly and disgruntled. The latter grinned sheepishly at the quartet, even nodded amiably to Harold.

One minute after them, Burkinshaw. Three, the Supreme Lord, came in and took the center seat. His awesome name and imposing title fitted him like somebody else's glove, for he was a small, thin man, round-shouldered, narrow-chested, with a pale, lined face. His balding head had wisps of gray hair at the sides, and his eyes peered myopically through rimless pince-nez. His whole appearance was that of a mild and perpetually preoccupied professor—but his mind was cold, cold.

That mind was now wide open to the three. It was a punctilious mind, clear and sharp in form, operating deliberately and calculatingly through the mixed output of the other humans at the Council table.

Arranging some papers before him, and keeping his gaze fixed upon the top sheets, Burkinshaw spoke in measured, unhurried tones, saying, "I don't doubt that you can read my mind and are reading it now, but in justice to the Lingan, who cannot do so, and for the benefit of my fellows who are not telepathic either, I must use ordinary speech." He adjusted the pince-nez, turned over a sheet of paper and continued.

"We, of the Imperial Council of Action, have decided that the safety of the Empire demands that we obliterate the planet known to us as KX-724 together with any adjacent planets, satellites or asteroids harboring its dominant life form. We are now met to consider this life form's final plea for preservation, and it is the duty of each of us to listen carefully to

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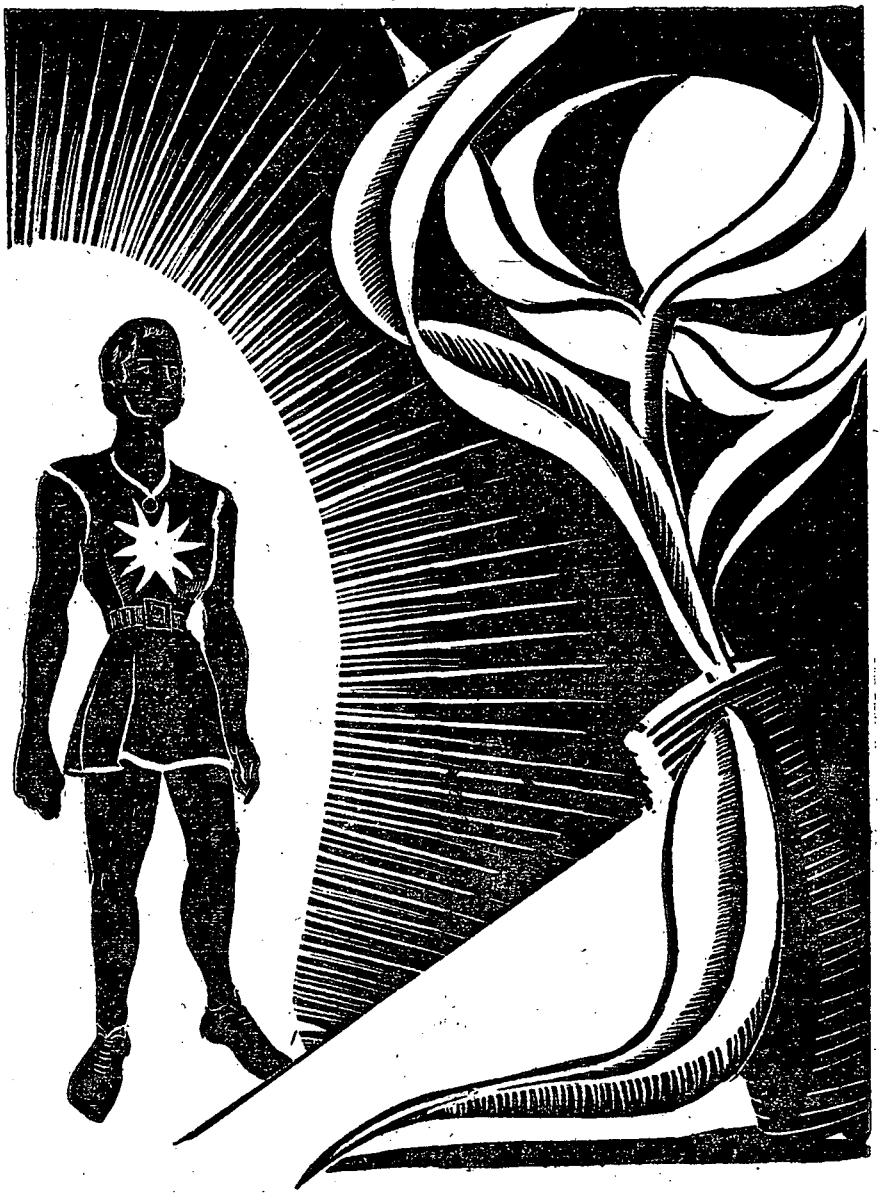

what new evidence may be offered, weighing it not with favor or with prejudice, but with justice."

Having thus spoken, the Supreme Lord removed his pince-nez, polished each lens, clipped them carefully on his nose, stared owlishly over their tops at the

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prisoners. His eyes were a very pale blue, looked weak, but were not weak.

"Have you chosen your spokesman?"

Their minds conferred swiftly, then Harold said, "I shall speak."

"Very well then." Burkinshaw relaxed in his seat. "Before you commence it is necessary to warn you that our grave decision concerning the fate of your people is neither frivolous nor heartless. In fact, it was reached with the greatest reluctance. We were driven to it by the weight of evidence and, I regret to say, additional data which we've recently gained is of a nature calculated to support our judgment. Bluntly, your kind of life is a menace to our kind. The responsibility now rests with you to prove otherwise—to our satisfaction."

"And if I can't?" queried Harold.

"We shall destroy you utterly."

"If you can," said Harold.

The assembled minds reacted promptly. He could hear them, aggressive and fuming. The purple thing exuded no thoughts but did give out a queer suggestion of imbecilic amusement. The Floran's attitude was one of mild surprise mixed with interest.

Burkinshaw wasn't fazed. "If we can," he agreed blandly, while his brain held little doubt that they could. "Proceed in your own way," he invited. "You have about fourteen hours in which to convince us that our decision was wrong, or impracticable."

"You've tempted us into giving minor demonstrations of our powers," Harold began. "The Drane was planted here for a similar purpose: you used him as a yardstick with which to measure our mental abilities. From your viewpoint, I guess, the results have strengthened your case and weakened ours. Only the yardstick wasn't long enough."

Burkinshaw refused to rise to the bait. Placing his fingertips together as if about to pray, he stared absently at the ceiling, said nothing. His mind was well disciplined, for it registered no more than the comment, *"A negative point."*

"Let it pass," Harold went on, "while I talk about coincidences. On my world, a coincidence is a purely fortuitous lining-up of circumstances and either is isolated or recurs haphazardly. But when a seeming coincidence repeats itself often enough, it ceases to be a coincidence. You know that, too—or ought to know it. For example, let's take the once-alleged coincidence of meteoric phenomena appearing simultaneously with earthquakes. It occurred so frequently that eventually one of your scientists became curious, investigated the matter, discovered solar-dynamic space-strain, the very force which since has been utilized to boost your astrovessels to supra-spatial speeds. The lesson, of course, is that one just can't dismiss coincidences as such when there are too many of them."

"A thrust — toward where?" mused the Floran.

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"No point yet apparent," thought Burkinshaw.

"I don't like the way he gabbles," said Helman's mind uneasily. *"He's talking to gain time. Maybe the three of them are trying to push something through that screen. They burned the Drane through it, didn't they?"* He fidgeted in his seat. *"I don't share B's faith in that screen. Curses on Roka and all the rest of the pioneering crowd —they'll be the end of us yet!"*

Smiling to himself, Harold continued, "We've found out that the game of chess is generally known all over the Empire."

"Pshaw!" burst out the harsh-voiced man seated on Burkinshaw's left. "That's no coincidence. It spread from a central source as anyone with a modicum of intelligence should have deduced."

"Be quiet, Dykstra," reproved Burkinshaw.

"Which source?" Harold asked him.

Dykstra looked peeved as he replied, "Us! We spread it around. What of it?"

"We had it long before you contacted us," Harold told him.

Dykstra opened his mouth, glanced at Burkinshaw, closed his mouth and swallowed hard. Burkinshaw continued to survey the ceiling.

Harold pursued, "We've had it so long that we don't know how long. The same board, same pieces, same moves, same rules. If you work it out, you'll find that that involves a very large number of coincidences."

They didn't comment vocally, but he got their reactions.

Four of the Council were confused.

"Surprising, but possible," mused the Floran.

"What of it, anyway?" inquired Dykstra's mind.

"No point yet apparent," thought Burkinshaw coolly.

The purple thing's brain emitted a giggle.

"Bron," said Harold. "Walt Bron, Robertus Bron and umpteen other Brons. Your directory of citizens is full of them. My world, likewise, is full of them, always coupled with the other parent's name, of course, and occasionally spelled Brown, but pronounced the same. We've also got Roberts and Walters." He looked at Helman. "I know four men named Hillman." He shifted his gaze to the Supreme Lord. "And among our minor musicians is one named Theodore Burkinshaw-May."

Burkinshaw removed his stare from the ceiling and concentrated on the wall. *"I see where he's going. Reserve judgment until he arrives."*

"The vessel which brought us here was named the *Fenix,* in characters resembling those of our own alphabet," Harold continued. "And in days long gone by, when we had warships, there was one named the *Phoenix.* We found your language amazingly easy to learn. Why? Because one-fifth

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of your vocabulary is identical with ours. Another fifth is composed of perversions of our words. The remainder consists of words which you have changed beyond all recognition or words you've acquired from the peoples you've conquered. But, basically, your language is ours. Have you had enough coincidences?"

"Nonsense!" exclaimed Dykstra loudly. "Impossible!"

Burkinshaw turned and looked at Dykstra with eyes that were reproving behind their lenses. "Nothing is impossible," he contradicted mildly. "Continue," he ordered Harold, while his thoughts ran on, *"The pleader is making the inevitable point—too late."*

"So you can see where I'm going," Harold remarked to him. "Just for one final coincidence, let me say I was stupid enough to misunderstand the imperial title. I thought they called themselves Lords of Terror. A silly mistake." His voice slowed down. "Their title is a mystic one rooted deep in your past. They call themselves Lords of Terra!"

"Dear me," said Dykstra, "isn't that nice!"

Ignoring him, Harold spoke to Roka. "You're awake by now. Last night something clicked in your mind and you found yourself remembering things you didn't know you'd forgotten. Do you remember what my people call their parent planet?"

"Terra," Roka responded promptly. "I reported it to the Supreme Lord this morning. You call yourselves Terrestrials."

Dykstra's heavy face went dark red, and accusations of blasphemy were welling within his mind when Burkinshaw beat him to it.

"This morning's revised report of Lieutenant Roka and certain survivors of his crew now lies before the Council." He indicated the papers on the table. "It has already been analyzed by the police commissioner, Inquisitor Helman and myself. We now believe that the pleader's assertions are founded in truth and that in discovering KX.724 we have discovered our long-lost point of origin. We have found our mother planet. The *Fenix,* unknown to any of us, was homeward bound!"

Half the Council were dumfounded. The purple creature was not; it registered that human rediscoveries were of litle consequence to purple things. The Floran thought similarly. Dykstra's mind was a turmoil of confusion.

"A difference of three light-years has separated us for two thousand centuries," Harold told them quietly. "In that tremendous past we'd grown great and venturesome. We sent several convoys of colonists to the nearest system four and a half light-years away. We never knew what happened to them, for then followed the final atomic war which reduced us to wandering tribes sunk lower than savages. We've been climbing back ever since. The path of our climb has been very different from yours, for

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roving particles had done strange things to us. Some of those things died out, some were rooted out, others persisted and made us what we are today."

"What are you?" inquired the member next to Roka.

"Humanity metamorphosed," Burkinshaw answered for him.

"In the awful struggle for life on new and hostile worlds, you, too, sank," Harold continued. "But you climbed again, and once more reached for the stars. Naturally, you sought the nearest system one and a half light-years away, for you had forgotten the location of your home, which was spoken of only in ancient legends. We were three light-years farther away than your nearest neighboring system. Logically, you picked that—and went away from us. You sank again, climbed again, went on again, and you never came back until you'd built a mighty Empire on the rim of which we waited, and changed, and changed."

Now they were all staring at him fascinatedly. Even Dykstra was silent, his mind full of the mighty argosy across the ages. Half of it was school-book stuff to him, but not when presented in this new light.

"Those of you who are of the Brotherhood of the Budding Cross know that this is true—that you have completed the circle and reached the Seat of Sol." He made a swift and peculiar sign. Two of his audience responded automatically.

"It's of little use," Burt's thought came over strongly. *"They're too factual."*

"Wait!"

The Council was silent a long time, and eventually the Floran said, "All this is very touching—but how touching will it be when they take over our Empire?" To which its mind added, *"And we Florans swap one master for another. I am against it. Better the devil you know than the devil you don't."*

Resting his thin arms on the table, Burkinshaw Three blinked apologetically at the Terrans and spoke smoothly. "If they knew what we know, the Empire's sentimentalists might be against your destruction. However, the fabric of our cosmic edifice cannot be sustained by anything so soft as sentiment. Moreover, the prodigal sons have no intention of presenting this fatted calf to their long-lost fathers. Your removal from the scheme of things appears to me as necessary as ever—perhaps even more necessary—and that it will be patricide makes no difference to the fact." His thin, ascetic face held an ingratiating wish to please. "I feel sure that you understand our position. Have you anything more to say?"

"No luck," whispered Melor. "The hatred has gone—to be replaced by fear."

Harold grimaced, said to the Supreme Lord, "Yes, I'd like to say that you can blast Terra out of existence, and its system along with it, but it'll do you no good."

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"We are not under the delusion that it will do us any good," declared Burkinshaw. "Nor would we sanction so drastic an act for such a purpose." He removed his pince-nez, screwed up his eyes as he looked at his listeners. "The motive is more reasonable and more urgent—it is to prevent harm."

"It won't do that, either."

"Why not?"

"Because you're too late."

"I feared you'd say that." Burkinshaw leaned back in his seat, tapped his glasses on a thumbnail. *"If he can't satisfy me that his claim is well-based, I shall advance the hour!"* Then he said, "You'll have to prove that."

"There's trouble on four out of the five other planets in this system. You've just had news of it. Nothing serious, merely some absenteeism, sabotage, demonstrations, but no violence. It's trouble all the same—and it could be worse."

"There's always trouble on one planet or another," put in Helman sourly. "When you're nursing four thousand of them, you get used to unrest."

"You overlook the significance of coincidences, I fear. Normal troubles pop up here and there, haphazardly. These have come together. They've kept an appointment in time!"

"We'll deal with them," Helman snapped.

"I don't doubt it," said Harold evenly. "You'll also deal with an uproar in the next system when you get news of it soon. You'll deal with four planets simultaneously, or forty planets—simultaneously. But four hundred planets—simultaneously—and then four thousand! Somewhere is the number that'll prove too much for even the best of organizations."

"It's not possible," Helman asserted stubbornly. "Only two dozen of you Terrans got here. Roka told us that. You took over his ship, substituted two dozen Terrestrials for part of his crew, impressed false memories on his and the others' minds causing them to suspect nothing until their true memories suddenly returned." He scowled. The pulse in his forehead was beating visibly. "Very clever of you. Very, very clever. But twenty-four aren't enough."

"We know it. Irrespective of relative powers, some numbers are needed to deal with numbers." Harold's sharp-eyed gaze went from Helman to Burkinshaw. "If you people are no more and no less human than you were two hundred thousand years ago—and I think that your expansive path *has* kept you much the same—I'd say that your bureaucrats still live in water-tight compartments. So long as supposedly missing ships fail to observe the officially prescribed rigmarole for reporting, it's taken that they're still missing. And, ten to one, your Department of Commerce doesn't even know that the Navy has mislaid anything."

It was a tribute to the Supreme Lord's quick-wittedness that his mind was way ahead of his con-

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freres', for he acted while they were still stewing it over. He switched on the televisor set in the wall on one side.

Looking at its scanner, he said sharply, "Get me the Department of Commerce, Movements Section."

The screen colored, a fat man in civilian attire appeared. An expression of intense respect covered his ample features as he identified his caller.

"Yes, your excellency?"

"The Navy has reported two vessels immobilized beyond the Frontier. They're the *Callan* and the *Mathra*. Have they been recorded recently in any movements bulletins?"

"A moment, your excellency." The fat man disappeared. After some time, he came back, a puzzled frown on his face. "Your excellency, we have those two ships recorded as obsolete war vessels functioning as freighters. Their conversion was assumed by us, since they are transporting passengers and tonnage. The *Callan* has cleared four ports in the Frontier Zone, Sector B, in the last eight days. The *Mathra* departed from the system of Hyperion after landing passengers and freight on each of its nine planets. Its destination was given as external to the Frontier Zone, Sector-J."

"Inform the Navy Department," Burkinshaw ordered, and switched off. He was the least disturbed individual at the table. His manner was calm, unruffled as he spoke to Harold. "So they're busily bringing in Terrans or Terrestrials or whatever you call yourselves. The logical play is to have those two vessels blown out of existence. Can it be done?"

"I'm afraid not. It depends largely upon whether the ships getting such an order have or have not already come under our control. The trouble with warships and atom bombs and planet-wreckers is that they're useful only when they work when and where you want them to work. Otherwise, they're liabilities." He gestured to indicate Burt and George. "According to my friends, the bomb allocated to Terra is on the ship *Warcat* clearing from your third neighbor. Ask Amilcare about it."

It required some minutes to get the third planet's Lord on the screen, and then his image was cloudy with static.

"Where's the *Warcat?*" rasped Burkinshaw.

The image moved, clouded still more, then cleared slightly. "Gone," said Amilcare jovially. "I don't know where."

"On whose authority?"

"Mine," Amilcare answered. His chuckle was oily and a little crazy. "Jon wanted it so I told him to take it. I couldn't think of anything you'd find more gratifying. Don't you worry about Jon —I'm looking after him for you."

Burkinshaw cut him off. "This Jon is a Terran, I suppose?"

"A Terrestrial," Harold corrected.

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"Put a call out for him," urged Dykstra irefully. "The police won't all be bereft of their senses even if Amilcare is."

"Let me handle this," Burkinshaw said. Then, to Harold, "What has he done with the *Warcat?*"

"He'll have put somebody on it to control the crew and they'll be giving you a demonstration of what a nuisance planet-wreckers can be when they drop where they shouldn't."

"So your defense is attack? The bloodshed has started? In that case, the war is on, and we're all wasting our—"

"There will be no bloodshed," Harold interrupted. "We're not so infantile as that. None's been shed so far, and none will be shed if it can be avoided. That's what we're here for—to avoid it. The fact that we'd inevitably win any knock-down and drag-out affair you care to start hasn't blinded us to the fact that losers can lose very bloodily." He waved a hand toward the televisor. "Check up with your water-tight bureaucrats. Ask your astronomers whether that refueling asteroid of yours is still circling."

Burkinshaw resorted to the televisor for the third time. All eyes were on its screen as he said, "Where is *Nemo* now?"

"Nemo? Well, your excellency, at the present moment it is approaching alignment with the last planet *Drufa* and about twenty hours farther out."

"I'm not asking where it ought to be! I want to know whether it's actually there!"

"Pardon me, your excellency." The figure slid off the screen and was gone a long time. When it returned, its voice crept out of the speaker hushed and frightened. "Your excellency, it would seem that some strange disaster has overtaken the body. I cannot explain why we've failed to observe—"

"Is it there?" rapped Burkinshaw impatiently.

"Yes, your excellency. But it is in gaseous condition. One would almost believe that a planet-wrecker had—"

"Enough!" Without waiting to hear the rest, he switched off.

Lying back in his chair, he brooded in complete disregard of the fact that his mind was wide open to some even though not to all. He didn't care who picked up his impressions.

"We may be too late. Possibly we were already too late the day Roka came back. At long last we've fallen into the trap we've always feared, the trap we avoided when we vaporized that world of parasites. Nevertheless, we can still destroy Terra—they can't possibly have taken over every world and every ship and we can still wipe her out. But to what avail? Revenge is sweet only when it's profitable. Will it profit us? It all depends on how many of these people have sneaked into our ranks, and how many more can get in before we destroy their base."

Helman thought, *"This is it! Any fool could tell it had to come*

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sooner or later. Every new world is a risk. We've been lucky to get through four thousand of them without getting in bad. Well, the end could have been worse. At least, these are our own kind and should favor us above all other shapes."

Melor murmured, "Their hate has weakened, and their fear turns to personal worry. Excepting the Purple One and the Floran. The Purple One, who was amused, is now angry. The Floran, who was interested and amiable, now fears."

"That's because we're not of their shape. Racial antagonisms and color antagonisms are as nothing to the mutual distrust between different shapes. There lies the Empire's weak spot. Every shape desires mastery of its own territory. So far as we're concerned, they can have it," Harold commented.

Putting his glasses back on his nose, Burkinshaw sighed and said, "Since you intend to take over the Empire, our only remaining move is to issue a general order for the immediate destruction of Terra. No matter how many confiscated ships try to thwart my purpose, obedience by one loyal vessel will suffice." His hand reached out toward the televisor switch.

"We aren't taking over your Empire," Harold told him swiftly. "Neither do we wish to do so. We're concerned only that you don't take over our world. All we want is a pact of noninterference in each other's affairs, and the appointment of a few Lingans to act as ambassadors through whom we can maintain such contact as suits us. We want to go our own way along our own path, we've the ability to defend our right to do so, and the present situation is our way of demonstrating the fact. No more than that. If, peevishly, you destroy our world, then, vengefully, we shall disrupt your ramshackle collection of worlds, not with our own strength, but by judiciously utilizing yours! Leave us in peace and we shall leave you in peace."

"Where's our guarantee of that?" asked Burkinshaw cynically. "How do we know that a century of insidious penetration will not follow such a pact?" He stared at the four, his blue eyes shrewd and calculating to a degree not apparent before. "In dealing with us you've been able to use an advantage you possess which Florans, Lingans, Rethrans and others have not got, namely, you know us as surely as you know your own kith and kin." He bent forward. "Likewise, *we* know *you!* If you're of sound and sane mind, you'll absorb gradually what you can't gulp down in one lump. That's the way we acquired the Empire, and that's the way you'll get it!"

"We've proved to you that we can take it over," Harold agreed evenly, "and that is our protection. Your distrust is the measure of ours. You'll never know how many of us are within your Empire and you'll never find out—but obliteration of our parent world

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will no longer obliterate our life form. We have made our own guarantee. Get it into your head, there is no winner in this game. It's stalemate!" He watched interestedly as Burkinshaw's forefinger rested light on the switch. "You're too late, much too late. We don't want your Empire because we're in the same fix—we're too late."

Burkinshaw's eyes narrowed and he said, "I don't see why it's too late for you to do what you've been so anxious to prove you can do."

"The desire doesn't exist. We've greater desires. It's because we have wended our way through a hell of our own creation that we have changed, and our ambitions have changed with us. Why should we care about territorial conquests when we face prospects infinitely greater? Why should we gallivant in spaceships around the petty limits of a galaxy when some day we shall range unhampered through infinity? How d'you think we knew you were coming, and prepared for you, even though we were uncertain of your shape and unsure of your intentions?"

"I'm listening," observed Burkinshaw, his fingers still toying with the switch, "but all I hear is words. Despite your many differences from us, which I acknowledge, the ancient law holds good: that shape runs true to shape."

Harold glanced at Burt and George. There was swift communion between them.

Then he said, "Time has been long, and the little angle between the paths of our fathers has opened to a mighty span. Our changes have been violent and many. A world of hard radiation has molded us anew, has made us what you cannot conceive, and you see us in a guise temporarily suitable for our purpose." Without warning, his eyes glowed at the Purple One. "Even that creature, which lives on life force and has been sucking steadily at us all this time, would now be dead had he succeeded in drawing one thin beam of what he craves!"

Burkinshaw didn't bother to look at the purple thing, but commented boredly, "The Rethran was an experiment that failed. If he was of any use, he'd have got you long before now." He rubbed his gray side-hairs, kept his hand on the switch. "I grow tired of meaningless noises. You are now hinting that you are no longer of our shape. I prefer to believe the evidence of my eyes." His optics sought the miniature time-recorder set in a ring on his finger. "If I switch on, it may mean the end of us all, but you cannot hypnotize a scanner, and the scene registered in this room will be equivalent to my unspoken order—death to Terra! I suspect you of playing for time. We can ill afford further time. I give you one minute to prove that you are now as different from us as is this Floran or this Rethran or that Lingan. If you do so, we'll deal with this matter sensibly and make a pact such

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as you desire. If not"—he waggled the switch suggestively—"the slaughter starts. We may lose—or we may not. It's a chance we've got to take."

The three Terrestrials made no reply. Their minds were in complete accord and their response was simultaneous.

Dykstra sobbed, "Look! Oh, eternity, look!" then sank to his knees and began to gabble. The purple creature withdrew its eyes right into its head so that it could not see. Burkinshaw's hand came away from the switch; his glasses fell to the floor and lay there, shattered, unheeded. Roka and Helman and the other humans on the Council covered their faces with their hands which slowly took on a tropical tan.

Only the Floran came upright. It arose to full height, its golden petals completely extended, its greenish arms trembling with ecstasy.

All flowers love the sun.

THE END.

THE ANALYTICAL LABORATORY

Squeezed out completely last month, the Lab is squeezed to very small compass this issue, so a fairly simple statement of points is called for. But one comment is definitely in order: Meihem In Ce Klasrum, by Dolton Edwards, in the September issue, was obviously a howling success. It's been reprinted several times elsewhere, already, in newspapers and other places. But to the reports:

August Issue

Place	Story	Author	Points
1.	Slaves of the Lamp	Arthur Leo Zagat	2.00
2.	Child of the Gods	A. E. van Vogt	3.03
3.	The Cat and The King	Raymond F. Jones	3.07
4.	The Last Objective	Paul Carter	3.33
5,	Bankruptcy Proceedings	E. Mayne Hull	3.41

September Issue

1.	The Toymaker	Raymond F. Jones	2.53
2.	Tie:		
	Vintage Season	Lawrence O'Donnell	3.00
	Evidence	Isaac Asimov	3.00
3.	Slaves of The Lamp	Arthur Leo Zagat	3.33
4.	Blind Time	George O. Smith	4.13

THE EDITOR.

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THE IMPOSSIBLE PIRATE

BY GEORGE O. SMITH

Precisely so — impossible. Which was what made it so hard to catch him! There wasn't any possible way he could escape—

Lieutenant Jeffries blinked at his superior. "I appreciate the compliment," he said dryly. "For which thanks. But what happens if I don't produce?"

His superior, Captain Edwards of the Solar Police, smiled vaguely. "I have a dual purpose," he said. "First-off, you need a vacation of sorts. Knowing you as I do, I know that sheer vacation would bring about seventeen kinds of psychoneuroses, some mental aberrations, and possible revolt. However, this job is unattached."

"Unattached?" gasped Jeffries.

"Uh-huh. You have six months in which to track down, and/or procure evidence which will result in the identification, arrest, and conviction of the man known as Black Morgan, the Pirate."

"I . . . ah—?"

"This is your only order. You will not be called upon to do anything else for six months. If at the end of that time you bring about such evidence, et cetera, you will be promptly promoted. If you do not, we will not hold it against you, for all of us have tried and all of us have failed. I'll not punish a man for failing to do that which I have been unable to do. You're an excellent officer, Jeffries, and you've earned a rest. You are now on unattached duty, and can command anything that your job requires, providing your weekly report to

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this office justifies the expense."

Jeffries smiled weakly. "Frankly, you expect me to fail?"

Captain Edwards nodded. "I do. But the junketing around will give you a bit of a rest and the seeking for this character will keep your mind alert. So, Lieutenant Jeffries, go out and catch me Black Morgan, the Pirate!"

Jeffries grinned. "And meanwhile I shall also make a landing on the mythical planet Vulcan, locate the Gegenschein, and bring back a covey of Voimaids with their equally mythical pet, the Hydrae."

Edwards laughed. "Yup," he said, still chuckling. "Now scat, because I have work to do."

Jeffries nodded and saluted genially. "I'm it," he said. Then he turned and left the office.

Captain Edwards looked after the leaving officer and nodded paternally. Jeffries was an excellent officer. He was loyal, ambitious, and zealous. Cases assigned to him came in after a reasonable length of time, and they were sealed shut and glued down with all the necessary evidence. Those cases that were not to go to court, complete, were those in which the criminal preferred to shoot it out, and Lieutenant Jeffries was both brave and an excellent shot—as well as being a good strategist. He'd been working too hard, and as Edwards said, a real vacation would have been boring.

The will-o'-the-wisp known as Black Morgan, the Pirate, would give him a rest.

Jeffries went home to pack. Black Morgan was a space pirate and the place to look for him was in space. That space piracy was impossible for divers reasons seemed to make little difference to Black Morgan. He did it.

Lieutenant Jeffries made his plans, knowing the facts. First was to encounter Black Morgan. Theorizing how it would be possible to commit piracy on a ship traveling at twenty-five hundred miles per second, running at 3-Gs constant acceleration would do no good. It had been agreed impossible. Yet Black Morgan did it.

So Jeffries must first encounter the villain and then take after him. With but six months, Jeffries could not even begin to inspect the corners of the solar system that *hadn't* been covered before.

But unlike straight hunting, in which the hunter must locate his quarry, when hunting rats, you bait rattraps and let the rat come to you.

Accordingly, Lieutenant Jeffries made a personal call to the Office of Shipping and requested confidential data on all shipments of high value, and then picked out the first. To add to the certainty, Jeffries called upon the editor of a sensation-seeking news agent and disclosed the fact that he, Lieutenant Jeffries, was being sent on the *Martian Queen* to protect a shipment of radiosodium.

Then, when the time came, Lieutenant Jeffries went boldly

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to the space line terminal and embarked.

The first part of the trip was uneventful. At 3-Gs, the ship's velocity mounted swiftly as the hours passed under the constant acceleration. Jeffries watched the crew and the passengers idly, because all of them had been thoroughly investigated before the ship's take-off. They were citizens about which there could be no doubt, and therefore anything but a cursory watch was unnecessary. Jeffries divided his time between the passengers and the Chief Signal Officer, Jones, who willingly gave him whatever information he needed.

At one time, Lieutenant Jeffries asked Jones why space piracy was considered so impossible.

"You mean Black Morgan," smiled Jones. "Well, space piracy isn't impossible excepting the way he is supposed to do it. Piracy near either terminal might go off. But when we're rattling through space near mid-course at about two thousand miles per second, how could it be done?"

"Don't follow," objected Jeffries.

"First, 3-Gs is about all that people can stand over any long period. You can take five sitting down, and about eight lying on a pressure mattress, and I've heard of men taking fifteen while immersed in a pressure-pack that equals the specific gravity of the human body. But taking even 5-Gs for any length of time will kill. Even three is a strain for men who have been raised under one."

"Yes?" prompted Jeffries.

"It's the timing that would stop

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him," said Jones. "You can't possibly lie await in space until we come into detector range because detector range is about a million miles. At one thousand miles per second, that's offering you one thousand seconds from extreme range to zero range and another thousand from zero range to extreme range on the other side—on the way out. Two thousand seconds is about thirty-three minutes. To match our speed in that time would require an acceleration of about twenty-five hundred feet per second, which is approximately 75-Gs. Impossible! Plus the fact that he would have to lie in space within a million mile radius of our course."

"Supposing he picked up your trail close to Terra?"

Jones smiled. "If he could detect us, we'd detect him," laughed Jones.

"Supposing he had a better detector."

"We're at the theoretical limit of sensitivity now," said Jones. "And we've been there for years. The noise level, thermal agitation in the set itself, and a horde of other things limit the ultimate sensitivity of any detector. And don't mention noise-eliminators. They aren't. You can't stop electrons from rubbing one another and that's that!"

"But—?"

"We—as he may—also use both pulse-type detectors and aperiodic receivers. People would have known that he was following them."

"Are you certain?"

Jones laughed. "Look, Lieutenant Jeffries, we're convoyed. There were two Solar Guard spacecraft that took off as we did, for convoy duty. Their job was to stick close by us all the way to Jupiter, right down to the landing on Callisto. Now, they'd follow anything that they saw suspicious. That's first. Secondly, we're at about three-quarters of the way to turnover now—and neither of the convoys are visible on the detector nor audible in the aperiodic receiver. If, Lieutenant Jeffries, two Guard ships, bearing the best in instrument and personnel, cannot stay within a million miles of us when they know our predicted course, how can you expect a pirate to barge in upon us when we're ramming space above two thousand miles per second? Detecting at these distances and at these velocities brings about a situation somewhat similar to Heisenberg's Uncertainty."

"Which is far above my policeman's mind," said Jeffries.

"You can detect where the spacecraft *was* when the transmitted pulse reached it and was echoed at X seconds ago. In order to know where it is, in truth, you must assume a velocity which you must get from the same gear. To assume the velocity, you must know exactly how far the ship traveled between pulses, which because of the fact that the pulses are transmitted different distances, is slightly difficult, especially when the doppler is changing."

"O. K.," smiled Jeffries. "So

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piracy is impossible. Then how does Black Morgan do it?"

"You know what I think?" said Jones.

"I'm a mind reader, of course," grinned Jeffries.

"Well, I wouldn't put it above certain blackguard spacecraft operators to pirate their own ships and then put up a large tale about Black Morgan. Does anybody ever really know—?"

"There have been authentic reports, made by reliable witnesses."

"O. K.," grunted Jones. "Then you tell me how it is done!"

"Me?" laughed Jeffries. "I'm hoping that Black Morgan will tell me in person."

Lieutenant Jeffries, although his very appearance was "policeman," did not act the part on this trip. He was the vacationer, the tourist. He danced well, considering his bulk, drank moderately, spoke quietly and intelligently, and made friends readily. He was always handy with his camera when something interesting went on, and he borrowed the spacecraft's darkroom to prepare the little tridimensional images of his fellow passengers.

In the latter, Jeffries was well-liked because he managed to flub all shots that were unflattering. Either he overexposed the block, or he miscalculated the development time, or he was forced to apologize for his clumsy fingers in the dark. At any rate, no pictures emerged from any shot that might be viewed with the owner's distaste.

He discussed his project openly, and there was many an argument over dinner. He thought, correctly, that people of honest lives would be interested in the thoughts and methods of a policeman and he talked openly. He had been a zealous policeman, and his store of incidents seemed unlimited, and unlike many, these tales were not all told with Lieutenant Jeffries as hero. In order to avoid the personal pronoun, he often told stories about himself in the third person, giving credit to some unknown member of the force.

And so by the time that the *Martian Queen* reached turnover, Lieutenant Jeffries was well-liked. He enjoyed this thoroughly, though in his spare moments he hoped avidly for Black Morgan.

And, of course, Black Morgan was inevitable. The ship and its cargo had been well publicized, as had been his intent. It was a set-up generated for Black Morgan, and any pirate who thought enough of himself to take on that name would never deny the challenge.

Black Morgan came a few hours after turnover. The ship's personnel and passengers had—ritualistically—watched the heavens revolve about their ship and had enjoyed the captain's dinner immediately afterwards. The skipper had treated them with stories of his own and had explained that it had been the original intention to serve the dinner during the turnover, but all pilots were not as capable as

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the one they had now, and the turnover had been known to be rough at times—and no space line liked to have the job of removing spilled soup from fifty evening gowns, let alone the bad publicity.

The dinner was finished, and the dancing was in full swing when the alarm bells rang loud and clear above the pleasant strains of the music.

The acceleration dropped immediately to 1-G which gave several people an internal stomach-wrangle similar to that not enjoyed by the stopping of a high-speed elevator.

And there, a half mile from the *Martian Queen,* ran another ship. It was black and chromium and deadly looking because of a triple-turret of heavy rifles that led the *Martian Queen* by exactly enough to make a perfect hit. Marksman Jeffries knew it, and so did everybody who looked.

Signal Officer Jones nudged Jeffries. "There he is," he said bitterly.

"No myth, anyway," grunted Jeffries.

"Nope."

"How'd he come up?"

Jones growled in his throat. "I'll never know," he said sadly. "One moment, the area was clean. Next moment, the celestial globe displayed a large ship, the detectors went crazy, and here he was!"

"Here he *is,* you mean," came a heavy reply, and everybody turned to see the menacing figure standing in the room, heavy automatics in either hand. "I thank you for lining up, ladies and gentlemen. It makes things so much easier. As you see, I've your captain under one of these. I'll not bother shooting the first one that makes an offside move. My first shot will kill the captain. My second will kill the first officer. I'll have whatever valuables are handy, and then I'll have that shipment of radiosodium."

"You'll—" started Captain Phillips.

"I'll kill you if you don't," gritted the pirate.

And that was that. Black Morgan knew what he was about, and he did it neatly and quickly. The valuables went into a sack and then they were all herded into a cargo hold and locked in.

Gravity went off completely, leaving them floundering in the room. The heavy shipment of radiosodium went out with only inertia to offer resistance.

An hour later, they forced the door of the cargo hold and the ship took up operations again. But Black Morgan was no longer in sight. The detector recorder indicated a receding target that must have been the leaving pirate craft, but that was all. Despite all arguments, Black Morgan had come up, pirated the craft at two-thousand, three hundred miles per second, under 3-Gs' deceleration from turnover, one hour and twelve minutes previous.

Yes, it was impossible and everybody knew that matching such constants in space could not be

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done, but Black Morgan had done it.

There was no merriment for the rest of the trip.

Back on Terra again, Lieutenant Jeffries found that he was in disgrace. His landing was followed almost immediately by an official order, and with sheer discouragement, Jeffries went to see Captain Edwards.

"That was a fine display," snapped his superior.

"But—"

"Look, Jeffries. You were sent forth to do a job. Anything you wanted we'd furnish. But you went out with a brass band and a challenge, and you were taken up and beaten. Not only that, but we lost a small fortune in radio-sodium."

"I'd hoped to—"

"Look, Jeffries, a mistake is a mistake. You laid a trap, and you also got some sort of evidence, I presume. That's fine. But you also laid yourself wide open to criticism. It's the people who are howling—the people and the officials of the space lines."

"But I—"

"You didn't catch Black Morgan," grunted Edwards sourly. "And what do you know about him?"

"He came up behind us at a velocity that apparently exceeded the speed of light, caught us, robbed us, and then left quietly."

"Exceeded the speed of light?" scoffed Captain Edwards.

"According to the recorder, he did."

"Yeah, that we know," grunted Edwards. "He is always *supposed* to. The detector's repetition-rate is about one every ten seconds, permitting ranges up to a million miles. The close-in detector runs one per second, and Black Morgan comes in from maximum range to close-in range between pulses. He hits once or twice on the close-in range—all of which gives definite evidence that he exceeds the speed of light. And he is instantly maneuverable! So he comes up behind you at a thousand times your velocity and slows down to match you in microseconds. This ain't possible—and everybody knows it!"

"Maybe he knows the answer," said Jeffries doggedly.

"Black Morgan has been doing that trick for eight years," snapped Captain Edwards. "During which time every scientist in the system has been seeking a means of copying it in some manner. Now don't tell me that one man can think up a method of space drive that the rest of the scientific world cannot even conceive as possible? Method—hell. They won't even permit its being possible, let alone finding a method. Now—you're it."

"I'm—it?"

Captain Edwards nodded solemnly. "I gave you this jaunt as a vacation. You boggled it. I'd not have minded failure. But the service can't stand having one of its men making monkeys out of everybody. Mere failure was to

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be expected. But you advertised for it, wanted it, took it, and then added the ignominy of having the space line lose a half a million dollars worth of radiosodium."

"So what am I going to get now?"

"Look," grunted Edwards, "I'm forced into this. I'm going to issue an official report that you are on the trail of Black Morgan and that the loss of the radiosodium is only temporary. You'll be placed officially on the case and this time, Jeffries, you'll either collect Black Morgan or you'll find yourself in disgrace. Now go out and get him or you'll lose your shirt!"

It was bad, admitted Jeffries. But it got worse as the weeks wore on. To avoid making futile reports, Jeffries kept on the move, and every time that he took to space, Black Morgan hounded him.

The pirate held up the *Callisto Clipper* and took only personal valuables. He pirated a million dollars worth of borts—black tool-diamonds—from the *Venus Girl* that Jeffries knew nothing about until he read it in the paper in connection with his own name—mentioned as protector! Black Morgan breached the *Brunnhilde of Mars* for the sole purpose of pirating all the liquor and stores aboard. He stopped the *Lunar Lady* to get a replacement for his own celestial globe, leaving the ship without a detector for the rest of the ship, for Black Morgan took not only the spares, but the operating equipment as well.

And each time he appeared, Lieutenant Jeffries was the brunt of Black Morgan's perverted sense of humor. He stole Jeffries' shoes once and mailed them back to Terran Headquarters. He took the policeman's cigarette lighter and returned it—engraved with a taunting message from himself to the "Pride of the Solar Police." And Jeffries rode the space lines to get away from himself but found Black Morgan hounding him.

The lieutenant ignored repeated demands for action, dropping official letters in the wastebasket because he knew what they contained. He avoided his favorite haunts. He sought out of the way places, hoping to learn something about that huge black spacecraft that came up from behind at the speed of light and matched velocity in microseconds. He sought the counsel of scientists who claimed it impossible. He read the rosters of the ships of all ports, and he sought the manufacturers of spacecraft, hoping to discover one that might have made the pirate's ship. None had—or anything resembling that description.

For Jeffries took pictures for some time before he abandoned his camera in dismay. The fun he'd had with it now seemed flat and odious. He sold it in disgust in a small secondhand store on Mars. He sold his personal belongings to get money, for his requests for funds were being viewed with scorn, and a personal appearance

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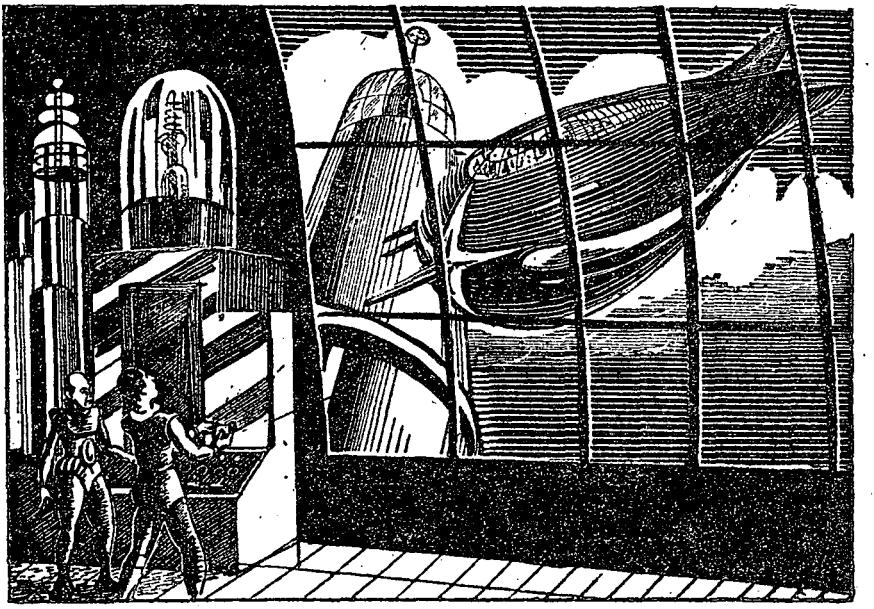

with a request meant more scathing remarks on his inefficiency. To avoid facing his failure, Jeffries spent his own money. He changed his appearance because the papers printed his picture as a failure every time there was piracy.

Black Morgan, on the other hand, was having the time of his life. He said so. Holding the entire ship's body at the point of his guns, Black Morgan taunted Lieutenant Jeffries: "I congratulate you, lieutenant," he said.

"You—!"

"Careful. I dislike profanity. I prefer this chase, Lieutenant Jeffries. I'd have taken only what I needed, but you gave me new life. Now I'm stealing for the fun of it—and to watch you combing space for a ship that—impossibly—can not be! Would you like to join me, lieutenant?"

Jeffries snarled, and the ship rang with the sound of Black Morgan's raucous laughter.

That, of course, hit the headlines. And the next time Black Morgan came, he said: "Ex-Lieutenant Jeffries! Pleased to meet you! Ensign Jeffries, I'd promote you, not reduce you in rank. Join me?"

And again that laughter.

It haunted the policeman's sleep. Jeffries set up trap after trap to locate the source of the pirate's information. For it was obvious that Black Morgan was following him around from planet to planet for the sole purpose of taunting him. When Jeffries sat in a restaurant, he wondered whether the man at the next table was Black

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Morgan in plain clothing, for the pirate wore fancy dress and a mask for his depredations. He watched men with him in hotel and on the street; in streetcar and drugstore. And when he took to space again, Black Morgan would be there to taunt him.

Using his own spacecraft, Jeffries paced the space lines ships, and found that keeping track of one was impossible. Even taking off at the same instant and following their course, known to him, he lost them after a few hours. He tried to put himself in the pirate's shoes, but lacked the ability to contact any spacecraft in the depths of space.

Here the taunts were not direct. After landing, he was informed again and again that Black Morgan had done this or had said that for his benefit.

He became known as a curse. No ship would take off with him even near—and often they took him to Venus when a ship was running to Mars with a valuable cargo. Black Morgan, he discovered, was not multiple. The pirate either hit his ship or the moneyed one, but never both.

But he was a marked man, hounded by the pirate. Eventually he became known regardless of his appearance, and he was denied passage, or even the knowledge of course, since his presence was asking for piracy—unless there was value going elsewhere. But aside from twice when they actually did send Jeffries with the valuables, thus fooling Black Morgan, the space lines decided that not having him at all was safer and cheaper in the long run.

Jeffries was—piracy-prone!

Ultimately he was asked for his resignation, and he gave it. He was through!

He sat in his apartment for days after that. Just sat there, thinking. He had been set to catch a pirate, and the pirate had been uncatchable. Jeffries had even tried the trick of putting himself in the pirate's place, hoping to follow a ship as Black Morgan had, and thus gain some idea of how it could be done. That, too, had failed.

Everywhere was negative evidence. Rated "Inconclusive" by all men who studied evidence as a means of extracting fact. Ex-Lieutenant Jeffries was no scientist; he was a policeman. He worked with hard facts always, and every case had its hidden clues of concrete fact. They all pointed out who the criminal was; seldom did they point conclusively to all possible suspects and point out who the criminal was not, save one. Therefore Jeffries was not experienced in coping with reams of negative evidence.

But he knew that he had nothing but negative evidence upon which to work. So, blunderingly, he went to work on the long, arduous process of elimination.

He wrote down his facts:

Black Morgan's ship was capable of exceeding the speed of light according to data. This was

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claimed impossible by all who knew about it and studied it.

Black Morgan, unerringly, was able to intercept a spacecraft traveling at twenty-five hundred miles per second.

Black Morgan was capable of coming up at a speed exceeding light, and decelerating to match the velocity of the ship in a matter of milliseconds. This would produce untold decelerative gravities in the ship—no man could hope to live and it was doubtful that any machine could withstand that treatment. At least, any machine of the size of a spaceship.

Black Morgan owned a large spacecraft of marked design. No spacecraft construction company had made it, and the construction of spacecraft is not a small project. This eliminates the possibility of small-yard construction and definitely removes the possibility of self-construction. Men have made boats in their basements, and automobiles in their attics, but no man has ever built a battleship or a spacecraft without owning a huge construction company.

The construction companies had all been investigated thoroughly. Black Morgan was not operating one on the side. He had no connection large enough to get a craft built and forgotten about. Besides, there was a fantastic reward for information of that nature, enough that any workman would be a fool to ignore it, and deliberately forget that he had once driven a rivet into the spacecraft now known as the *Black Morgan*.

Then Jeffries reread his statements. They added up to one thing: Black Morgan did not exist! Black Morgan was the Impossible Pirate.

So, he thought, *if Morgan does not exist, then he is a fantasy, a myth. The only evidence that is not strictly negative is the fact that an armed man enters the spacecraft in a standard spacesuit and holds up the passengers.*

Instruments do not lie, but it is possible to fudge up a detector. Either from the inside or externally. As for items A, B, C, and the rest, well—

Maybe Black Morgan didn't exist!

And if Black Morgan did not exist, ex-Lieutenant Jeffries knew how to catch him!

Black Morgan felt good. He permitted a single pang of sorrow for the hapless Lieutenant Jeffries, and then discarded the unlucky man. He looked to his gear, checked his instruments, and then inspected the big ship on the spaceport outside. Take-off was about ready, he knew, and they were carrying plenty. Life was less easy since Jeffries had gone; while the lieutenant was there, he was a fair weathervane, save for twice. But Jeffries as an indirect source of information was not destined to last forever, and now Black Morgan was reduced to bribing lower employees, watching the markets, and tapping the communications' beams.

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He watched, making certain of his plans, until the ship's ports closed. Then he poised and made ready himself. Then from the ship's drivers came that giveaway glare of violet-actinic light that seared the eyeballs of he who looked. The ship trembled slightly, and lifted at 3-Gs—its acceleration with respect to Mars was three Terran G minus the surface gravity of the Red Planet. It went up, gaining speed. The actinic glow increased as the distance from ground increased, and it cast its glare over the entire spaceport.

Then, unseen against the glare—he was but a small mote against a sea of blinding violet—Black Morgan took off.

A-space, the glare died out. It was an atmosphere-ionization, and by the time there was no atmosphere, Black Morgan was safe.

At turnover, the ship was hailed, as before. Black Morgan entered the ship as he had done many times, looted the passengers and the vault, made mocking jokes, and left. The ship went on, its passengers and crew cowed and beaten.

Black Morgan laughed uproariously.

Again!

He exulted, and feeling certain of his future, Black Morgan waited patiently. An hour—two—and then he was off toward Terra, laughing and plotting more piracy.

Then his alarm rang. Morgan blinked. A meteor— but no meteor ever rang the drive detector. That took energy output!

Morgan snarled and looked out of his port.

And there he saw a sight that terrified him. Through his mind passed the recollection of all the thousands that had seen a similar sight, though the markings were different. Instead of the chromium and black pirate craft, there rode a quiet Guardship, big and potent. Morgan was outgunned, for three solid turrets of three rifles each covered his smaller ship in an inevadable bracket of heavy fire. Resistance was impossible; he could not even fight like a cornered rat. He was forced, if anything, to suicide. Ignominious suicide, for there would not even be the chance to go out fighting.

The space door opened to admit a single man, clad in the uniform of the Solar Guard.

Morgan gulped and swore. "Jeffries!"

"Right," snapped the Guardsman.

Morgan grabbed for his guns and the cabin of the small craft was filled with the *crack-crack* of swift gun fire. Morgan fired once; Jeffries twice. Black Morgan missed, but Jeffries' first shot shattered the pirate's right wrist. The other gun dropped out of his hand from shock, and Jeffries strode up and covered the beaten pirate.

Jeffries did not return to his ship, but he took over the pirate's small craft and drove it to Terra. He handed the pirate over to Captain Edwards with a smile.

"This is he," he grunted. "And now what?"

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"You've won," smiled Edwards. His pleasure was honest. "If he's Black Morgan, you've won, and we can easily hush up any trouble. But can you prove it?"

"Sure," grinned Jeffries. "Cell him, and then come up to training school on the roof. This takes demonstration."

"O.K.," smiled Edwards. "It's your show."

Jeffries faced the group of experts, scientists, and police officials. At one side of him was the mock-up of the celestial globe used in training rookie spacemen. On the table beside him was a pile of equipment.

"This," he said, holding up the equipment, "is familiar. It is a small detector-pulse receiver. It is coupled with an attenuator and a variable delay line, and a minute re-transmitter. The celestial globe will show a target approaching the ship at a velocity exceeding the speed of light, and will match the ship's acceleration, velocity, and course in microseconds."

He started his equipment, and across the celestial globe in three distant flashes came a flitting target, to stop short of the ship's spotter in the center of the globe. From the other detecting equipment came indications and presentations as to type of drive, size of ship, and wave bands of the other ship's radiation.

Jeffries laughed, turning off his equipment. "When equipment is very sensitive, in order to collect information from great distances, a rather minute transmitter can produce a heavy target," he said. "Now,

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above the dome of the building—watch!"

He turned a square box at the sky and set it going. Black Morgan's ship came swooping down, to stand above the observation dome of the building, its rifles trained on the men inside. Jeffries turned dials and the turret turned slowly. He manipulated another dial and the big ship turned to face away. Then it receded and was gone in a twinkling of an eye.

"Three-dimensional projector;" he growled. "Just what they were using for moving pictures for a hundred years. And there's your answer!"

Captain Edwards stood up and nodded. "But look," he said. "How did the contact come?"

"Contact?" gritted Jeffries angrily. "The louse! He took off in a suit as the ship lifted from the port, and clung to it with his magnetics like a flea on a dog until he had a chance to do his job at high velocity. Then he would drop off and radio-control his own ship which was running free a few million miles behind, and destined to come within a few million miles of his position. It was set to about match his speed, and then at that velocity, to circle and spiral until it was within his range. There was no one aboard it, and so he could cram on gravities until it creaked. I swear it had on sixty gravities."

"But you—?"

"Remember, my hobby is photography. Photography itself is a matter of fantastic illusion. Your eyes, fallible as any sense, view a collection of light rays in a certain pattern and your brain says it is Uncle Julius. Iconography, when enlarged to life-size, can produce a solid image that from a distance can be mistaken. Iconocinematography does not produce a solid image but establishes a radiating point for heterodyned light, producing an apparent image that the real thing can go up and shake hands with—providing his timing is good, for the image is unreal.

"So there's Black Morgan. Since he could not exist in fact, he did exist in the interpretation of incomplete data. Any man can fudge a detector by supplying false echoes from a delayed transponder. Anybody can project super image of a spacecraft by iconocinematography. And a spacesuit is capable of considerable motion of its own, plus the ability to cling like a leech to the hull of a ship under acceleration.

"At first I was a bit concerned about the effect of attacking an armed ship with an icono image—but I discovered that Black Morgan's real ship was as unarmed as any commerce vessel. He was the real fantasy!"

Captain Edwards smiled. "A good man, Jeffries," he said to his superiors. "And a good big man can still take a good little man's tricks and turn them against him!"

And Lieutenant Jeffries took a deep breath. "Now, sir," he said. "About that vacation—?"

THE END.

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FOR THE PUBLIC

BY BERNARD I. KAHN

The story of a doctor of the Lunar Quarantine Station and his routine job. And the routine was death—

The laughter was thin, sardonic and, to his hypertrophied sense of mental receptivity of the moment, acutely painful. Dr. David Munroe walked slowly back to his desk. It was a ritual to laugh, to accept such orders with a scornful grin.

The public demanded an insouciant bravery, callous indifference, perfect self-abasement in those destined to die for its own interests. The clerical crew were laughing at him now. They had to, or they would experience his own mind-chilling fear and know the symptoms of agonizing frustration.

Dr. David Munroe sat behind his desk, fingers whitened at their tips as he clasped and unclasped the elastic plastic arms of his chair; his mind a tight vortex of numbing, impotent anger. The flow of anger clutching his abdomen was like the painful waves of a gastric spasm.

He wanted to scream a defiant refusal at those powers representing the public who casually changed the order of his life and intended to dispose of its planned process with such indifference. But he put the heresy of such thoughts into

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the inner deeps of his subconscious mind. He had been too well schooled, too artfully conditioned by these same powers for anything but the most shallow type of emotional protest. The pain of it was: he knew it. Knew he could do nothing.

His thin fingers jabbed nervously at the phone box on his desk. The blond haired, fatuous face of his secretary appeared immediately. "Get the Office of Industrial Endocrinology." His mouth tightened to a narrow ridge of indignant resentment. "This call is not for the public. Tell the Lunar Operator to put the charges on my bill."

"Yes sir." The secretary's face was bovinely expressionless. "You wish to speak to Dr. Roberta Wallace?"

As she blanketed the phone he could hear the thin, derisive laughter of the clerks, heard one of them saying: ". . . the boss won't be alive much longer."

He stared at the various colored phones, panels and screens which brought him visual, vocal contact with the subsidiary activities of his quarantine station, as if he had never seen them before. His fingers caressed the communication tapes emerging from the desk as if touching them for the last time. The metronomic clicking of the filing cabinet behind him was now as depressing as a requiem.

By sheer effort of will he channeled his mind into cortico-thalamic patterns, sought analysis of his emotional chaos. It wasn't, he realized, the terror that comes with the foreknowledge of impending death which aroused such high emotivity. Nor was it the anger in protest of having to go to Exotic for the third time, an order which was in violation of the mores of the Bureau. He was far too well integrated for such thalamic emotions. It was the cerebration of the fear of disease before death.

It was the cold unescapable fact that by all the laws of chance he would be diseased before he did die; and the lack of the knowledge of what disease it might be, perhaps a new one, was cause enough for his cortical unrest.

He leaned back in the softly padded chair, placed sweaty palms together, realized he had to adjust his affairs. He curtained his cold, black thoughts with reality, wondered with a wry sense of humor to whom he would will his skicar.

The gong of the operations vodaphone erupted sharply into his mind. His schizoid preoccupation vanished instantly as he punched knobs on his phone, brought the duty officer to focus.

"*S. S. Sylvestrus;* PF-704: Interglobal Lines is standing off requesting pratique. Senior Medical Officer is Dr. Guerdian Lilly: Professional 32-56-2134. You will contact the ship and take such action as is necessary for the public."

Dr. Munroe swung to the filing cabinet behind his desk, punched name and number of the ship's doctor. The microcard slid into

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the viewer, was projected on the screen. Dr. Munroe scanned the professional qualifications of the medical officer. He dialed the ship's medical number.

The face of the gray-haired, alert eyed physician appeared on the screen instantly. "This is Lilly, Medical Officer of the *Sylvestrus* requesting pratique."

Munroe transferred the image of the photograph on his card with the picture of the man on the sceen to the analyzer. Automatically the pictures blended. He looked at the likeness calibrator. The point of feature differential was well within the margin of error allowed for aging difference. Apparently they had not been out very long. He waited while a new photograph was made, became a part of the doctor's master card.

"This is Munroe, Senior Medical Officer, Ninth Lunar Quarantine Station. Report point of departure, duration, and nature of voyage. List all patients with their diseases. This demand is made for the public."

"Earthing from Ferenzia, Planet II; Albrecht System. Freight has been subjected to approved routine decontamination procedures. Holds are now under three atmospheres of chloropoxsine. Ship's company consists of two-twenty officers and ratings. Passengers twelve hundred and ten. One birth en route. No deaths. One case of ondecca fever, cured without sequelae. Request clearance."

"Pratique granted."

He turned to the other phone announcing the arrival of a freighter from Halseps. His mind leafed through the pages of memory to recall the planet. He was forced to go to the planetary index file. It was a small planet of a distant sun on the very periphery of man's growing empire. Operations could tell him nothing about the ship or the medical officer.

When he called the ship, the grooved face of a snarl-haired, black-browed, square-chinned man appeared. An officer's cap was cocked on the ragged remnant of one ear. His beady, black eyes were venomously sadistic. "I'm Bill Blackbern, medical officer of the ship," his voice was angrily resentful, "don't remember my number. We ain't got any disease aboard. We want to clear for Earth. Is that satisfactory with you boys." He finished sarcastically.

Dave Munroe punched out the name and from more than five million medical cards in his filing cabinet, two photomicrographs slid into the projector. One of them was a new graduate. The face of the freighter's medical officer was similar to the other card but feature correlation was ejected by the analyzer.

"Place your face one inch from the screen," Dave ordered, "and open your eyes wide." He slid an ophthalmoscopic camera over his screen, photographed the eye grounds of the doctor, compared those with the prints he had. They tallied.

"Look, Doc," Blackbern's voice was a rasping growl, "I said we want to clear Earthwards. Our

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ship is clean in and out. Our holds are filled with treated nalyor skins. Soft beautiful pelts that glow in the dark like each strand was made of platinum. The finest things ever to come from an animal. The gals will go wild over them. Give us clearance and I'll see you get one. They're worth a thousand stellars each. Nice thing for your wife."

At the mention of wife a sick feeling of anguish followed by a surge of unreasoning anger swept him. He ignored the bribe. "My records fail to show me what ship you're in. My last entry is dated seven years ago when you were expelled from practice on Dynia."

"I was railroaded by one of the big companies," Blackbern exploded. "I got a job on this ship and we cruised about the Aldebaran nucleus. We're Earthing from Halseps. We've got thirty officers and men—"

"How many did you start with?"

"We started with about a hundred but—"

"What happened to them?" Dave asked sharply.

Blackbern grinned unpleasantly. "You ain't been out among the lesser rocks. Out there, there ain't no law, no God and the boys play for keeps. If you land on an airless planet and you got an enemy, you might find he's put metal filings in your atmosphere regenerator; or if it's a virulent planet why he might burn a weld in your armor." He laughed rudely. "The *Canaberra* is a clean ship, in and out."

"I'm familiar with conditions at the periphery," Dave said coldly. "Do you have any disease of any type in your ship?"

"If we do have, does it mean we can't go to Earth? We've got a fortune in skins. We'll take care of any spacemen—" He stopped suddenly.

Dave's nimble fingers danced over switches on his desk. "Attention in the Station! Attention Earth Guard! Attention Exotic Disease Control! The ship to which I'm now talking, the freighter *Canaberra,* Earthing from Halseps has been denied pratique. The professional ability and standards of the medical officer is open to doubt. Cradle ship for examination; begin routine external hull wash. This is for the public."

Blackbern's face became dark and ugly. "You and your public. All right you nosey pig-brain. I've got several guys here with something that acts like malignant tuberculosis, at least they're coughing their lungs out," he laughed sadistically, "but in little pieces you understand, just little pieces."

The closed phone from the yard office rang and the ground doctor appeared on the screen. "Dr. Munroe," he said, "I'd like to remind you there is no epidemiologist at Exotic. Only the pathology crew and the medics from the colonial office." He paused, "Dr. Craig died this morning."

"I know it. I'm taking over control this afternoon."

"Doctor, not you again," concern mirrored the physician's face. "That's too bad."

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"It's for the public," Dave said sharply.

"It's for the public," the doctor repeated the liturgy.

Dave pressed the stud turning on his window. He looked out over the quarantine station. Cupped in Tycho's crag-walled crater the symmetrical buildings were beautiful in their utilitarian design. The tackle gang expanding the cradle to receive a Transtellar freighter looked like silver bugs in the harsh, white sunlight. The ship settled into the ways like a ball floating slowly into a kitten's claws. An exploring battleship, cradled earlier, was discharging its crew into the Physicals Building. The ground crew was setting up fire guns preparing to wrap the hull in a sterilizing flame blanket. Lines hosing out to the ship from the Chemical Building, from this distance, looked like thin, golden snakes.

Above the Lunar surface, the *Sylvestrus* gathering speed for Earth was like a flaming mirror. Near her was the *Canaberra,* Blackbern's freighter.

He brought it closer on the screen and his lips curled in disgust. Its hull was a dirty black, mottled with areas of reddened corrosion. One of the port screens was blanked out by a cracked, plastic disk. The grounding tackle hung to the ship like shreds of seaweed to a rotten log. Freezing vapor from expanding air, escaping from a rent in the topside surface, looked like a thin plume of steam from a tea kettle.

The sight of the ship with its dread implications of disease was an anchor to his weary emotions. He realized again the public had to be protected from the biological catastrophe such a ship would cause.

One extraterrestrial disease, made horribly contagious by lack of any racial immunity would sweep Earth's billions; they would fall before such infection like pillars of steel in a neutrone flame.

He was a policeman; protecting the health of the public. A wave of pure contentment swept him, washed away the sodden feeling of morose despair and indignant anger.

The gong of the phone and the appearance of an unfamiliar face on the plate brought him to the screen. "This is the toll operator on Earth. Calling Dr. Munroe. Dr. Dave Munroe. Is this Dr. Munroe, Ninth Lunar Quarantine, Tycho?"

"This is Dr. Munroe. My number is Professional 33-64-1875. I am ready to speak. This call is not, I repeat, this call is not for the public."

"This call is not for the public," the operator repeated. "You will have a closed channel between you and your party. Vernier adjustment." She read off the settings for his phone. There was a flash of violet light, she disappeared and the clear, wide, gold-flecked eyes of Roberta were smiling into his own.

"When will it be, Davey?" Her voice held promise of happiness in its lilting richness. "I've never waited so impatiently."

He swallowed, hating to see the grinding crash of all their dreams.

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"It won't be, might never be, Roberta."

She leaned closer to her screen. So close she blanked out the details of the laboratory behind her. "You mean our marriage was forbidden?" Her lovely eyes widened in bewildered wonder. "But David. Why? Was it you? Me?"

He fumbled for a cigarette to hide the terrible burst of frustrated anger filling his mind. He forced sardonic laughter through his tight mouth. "The marital division of the bureau gave us a clean pratique. It was the"—He spit out the words —"the Bureau of Public Health, Epidemiology Division!"

"What! But David," startled surprise flickered between her level brows.

"They had good reason," he admitted, forcing himself to put it into words. "You see I'm to go to Exotic Disease Control."

"Ohhhhh! David no!" She capped her mouth with a long slender hand as her face became gaunt and pale. "Not again. Not that—" Her voice trailed off into a clicking whisper.

He tore a strip of tape from the scribe talk, transliterated the message slowly, realizing as he did so, he was reciting what might well be his own epitaph. " 'From: Director General, Public Health. To: All Personnel. Dr. James Craig, Commander in the Public Health, Senior Medical Officer, Exotic Disease Control, Lunar Station, died this morning while entering a disease ship. He willfully entered this ship, well aware of its hazards. His conduct was in keeping with the highest traditions of the Public Health Service. Signed: Gumnes, Director General.'

"Now listen. It's right on the same tape. Saving money," he explained bitterly. " 'Personal transfer order: Commander David Munroe, Planetary Epidemiologist, upon reporting to Commander Sigmund Russell, Planetary Epidemiologist you will take command of Exotic Disease Control to fill out the term of the late Dr. James Craig. This transfer is for the public.'

" 'From: Personnel Division: In accordance with Directive 43, Paragraph B of the rules and regulations of the Public Health Service which states that personnel assigned extra hazardous duty as exemplified by Exotic Disease Control may not be married; you, Dr. David Munroe are informed that your request for permission to marry Dr. Roberta Wallace is denied until such time as you have completed your newly assigned tour of duty. This denial is for the public."

"How long will you be there?" Roberta asked in a tight, hushed voice.

"I'll have about four months. I've been there twice, you know. No one," he said slowly, "has come back a third time."

She tried to sound matter-of-fact. "That's what comes from being a good doctor. Mediocrity does have its compensations." She forced a smile. "Just think it'll be double pay with a bonus. Oh! Dave, if only you don't have to go prowling

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around in some derelict. That is what gets them all."

"Some one has to see where the ship came from," he pointed out. "It's for the public."

"If you do get a derelict showing dead lights, just take the organisms and never mind trying to clean the ship for some big company. Don't try and be a hero."

He laughed at her advice. "That's all you ever do. Just open the ship at the landing room air lock, take a sample of the organisms. See if they are the lethal cause. If they are, you just turn them over to the bacteriochemists for classification. You let the pharmacology crew work out the antigen. Then you pull the log to see where the ship had been, sterilize it, turn it over to the Colonial Office."

"Promise me you won't go tramping around inside one of those ships." She insisted.

"That's sure death; particularly if the cause of the dead lights is bacterial. That's what killed Craig, I understand. They brought in a ship from the Mycops nucleus. The bacteria thrived on ultraviolet radiation. They were evolved in an atmosphere that was intensely ionized and extremely hot. I understand the planet is extremely rich in radium. He sterilized himself in an acid shower, covered himself with a flame blanket, but when he bivalved his suit in his quarters one of them must have still been alive. He was dead within an hour. They volatilized the ship." He shook his head. "Nope, I can assure you I won't go exploring into a derelict. Do I look as though I were dropped on my head as an infant?"

She ignored his humor. "Let me talk to the Director." She suggested tenderly. "I'm doing some work for his Bureau; maybe he'll listen to me and give you new orders."

The line of his mouth grew hard and chiseled at this threat to his masculine ego. "Roberta, you'll do no such thing. Look, I have a lot of work to do. I'll call you before I go over to Exotic."

"No, don't." She touched the corners of her eyes with a handkerchief. "I'll be here waiting for you when you return. Just return, that's all I'm warning you. Besides," she managed a smile, "I've got work to do, too."

"Once I get to Exotic, I can't call you, you know."

"That's better, it won't interfere with what I'm doing. I'm trying to set up a pharmacologic formula for chitinizing the skin of the beryllium workers in the mines of Nebos. Of course it has to be reversible so they can come back to their families. Besides," she laughed reflectively, "we should be saving our money. Just think when you come back you'll get a year's vacation. Let's settle on Zercan. I hear it's a gorgeous planet. I'll be a housewife and cook your meals right from cans like a real twentieth-century wife and you can practice medicine. Oh! David, do be careful."

He cut off the phone, hating himself for the emotionalism that made the globus form in his throat; realized the trajectory of such thoughts

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was causing mental trauma sufficient to make him a physical coward.

He clicked his jaws, drew up a scribe bank, dictated his will. He was removing his personal effects from the desk when Dr. Russell walked in.

"Personnel hated to do this to you," Russell informed him after their formal greeting, "but there was just no one else in the area with your experience who hadn't already been there twice. You were the nearest."

"It's for the public," Dave pointed out.

"Just don't venture beyond the landing rooms of any dead ships chasing unclassified bacteria," he cautioned, "and I'm sure you'll come through. Remember don't risk your life for nothing."

Dave thought the warning was excessive. "You want to be briefed on this station?"

"I had a similar duty on Meissner. Fill out any gaps for me." He clicked details on his fingers. "Lunar Operations routes the ship to your station. You check the ship's surgeon with the analyzer and if everything is kosher the ship is granted pratique for Earth."

"If feature correlation is in excess of aging difference, check eye grounds. Some of these tramp freighters can do wonders with illegal plastic surgeons. They drag in contraband and all kinds of organisms."

"I'll remember that. If the ship has a doubtful itinerary, cradle and your ground crew decontaminates the ship and its cargo and the junior medics examine the personnel. They report deviants to you for whatever action you decide."

"Whenever you have a doubt, send it to Exotic," Dave insisted.

The blond haired operator appeared on the phone. "Exotic Disease Control on 4; can you take the call?"

Dave flicked switches on his desk. "Munroe, Ninth Lunar Quarantine. You want me?"

"This is Thurman, chief of ratings at Exotic, sir. I called Operations and they referred me to you. The *Canaberra* is here, medical officer is a Dr. Blackbern. We started the routine hull wash but he refuses to let my crew in to decontaminate the hold areas. Dr. Nissen is examining the crew now. And, sir," Thurman appeared worried, "The *Starry Maid* is over us demanding that we remove some patients at once. Their doctor is most insistent."

"What's the *Starry Maid?*"

Russell leaned forward, blanked the phone. "That's the private yacht of Mr. Latham Nordheimer."

Dave whistled. "Where," he whispered, "would he have been to pick up anything needing Exotic?"

Russell shrugged. "He's got a socialite playboy for a medical officer. He couldn't tell the difference between simple acne and malignant space burn. He's my idea of what a high grade moron would be with no intelligence. He's crazy about Nordheimer's luscious daughter but whether it's mutual or not I don't know. Because he is so

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intellectually inferior he's like all dim brains; dangerous when crossed. He loves his power as medical man to one of Solar's richest men. He'd like nothing better than to turn in a doctor for a missed diagnosis."

"Nice boy to talk back to," Dave unblanked the phone. "Thurman, tell Dr. Blackbern I ordered you to enter the ship. If he questions this order further, call the Duty Officer of the Guard and request the riot Marines. I'll back you up."

"Shall I remove the patients from the *Starry Maid?*"

"No. They might have something contagious. Let them stew in their own impatience. We're the Public Health Service not animals to be ordered about."

He cut off the phone, poured two cups of coffee. "I'm not going to get high blood pressure for some rich man." Dave grinned at Russell. "Have you ever noted that a rich man becomes paranoid; starts thinking he is above the people."

Russell's laugh was as soothing as balm on a space boil. "Just the same I admire your courage telling the mighty Nordheimer to wait. It's always a comfort though to know the Bureau will back us up for the public."

Dave finished his coffee. He picked up the phone, announced to the station the transfer of authority. He turned off the desk, locked the tape box, handed over the keys to Dr. Russell. "It's all yours now. Would you have your steward pack my clothes and ship them to the Personnel Desk in the Bureau. I'll pick them up there if I come out of Exotic."

"Will do." At the panel leading to the mobile ramp Russell placed a comforting hand on Dave's shoulder. "Good luck, Munroe. Stay out of derelicts and I'll try not to send you anything green."

Exotic Disease Control is located on the northern edge of Mare Capsicum. The station is as functional as a lathe and with just about the same amount of beauty. It consists of a group of hemispherical buildings arranged concentrically around the metallic cradling table.

It lacks the dynamic architecture that makes Lunar Quarantine Stations so outstanding. Exotic Control was designed solely for isolating the new bacteria, viruses, fungae and yeasts with which mankind infects himself from the distant, biologically unexplored planets.

The little brown house, as the doctors refer to the isolation hospital, is located here. It is in its wards that passengers and spacemen, who have become infected, wait until their disease is cured or—! It is a part of the cost of spatial exploration; man would have it no other way.

At Exotic Disease Control are located the esoteric pathologists, the virologists, bacterio-chemists, pharmacologists. Here, too, are located the planetary cartographers and ecologists, ceaselessly studying the characteristics of the better planets so they can be certified for colonization.

When Dave alighted from the

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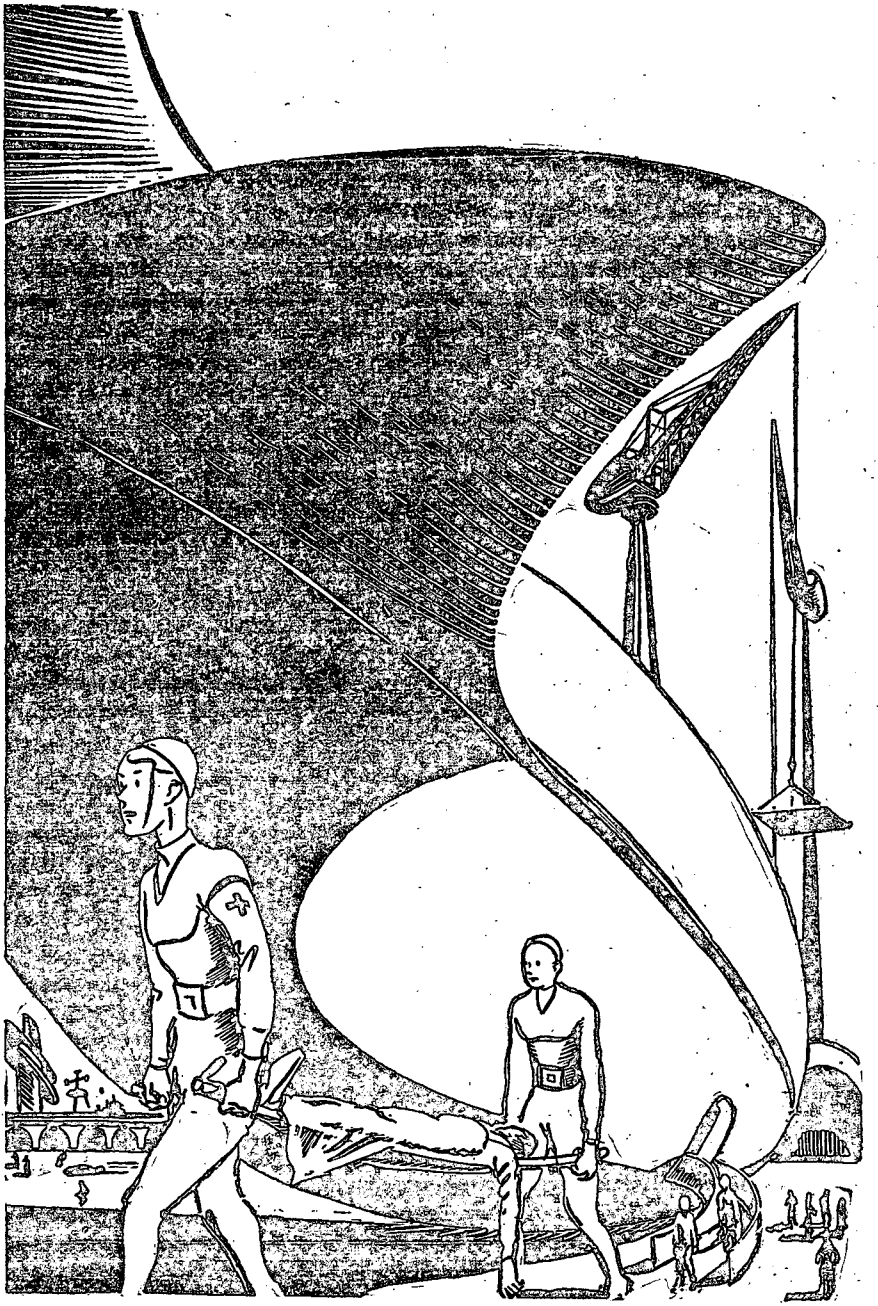

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luna car, the crew about the dirty freighter dropped chemical lines, greeted him with brazen clanging of metal as they clapped bronzed sheathed hands on the armor of his metal covered shoulders.

The medical division, the landing gangs, the sterile squads and the decontamination crews followed him into the Administration Building. "It's good to be back here again." Dave said when he had thrown back his glassite helmet.

At this palpable lie, all the men let out a whoop of laughter. He stilled it with raised hand. "I don't need to enlarge on our responsibility to the public. They trust us to prevent disease reaching Earth.

"We'll work here now just as we did the last time I was here. I alone will investigate ships from any of the outer nuclei, or those that have questionable disease in anyway. I will make all primary diagnosis and do autopsies on those remains found in ships. No one is to risk his life doing something that is my duty. These are my orders."

Dr. Blackbern shouldered his way through the group about Dave. "Cute talk you boys make. Very lovely prattle about the care the public gets, but how about me, us. We're a part of the public, too. I've been here now for three hours and all I've heard is talk, talk, talk."

His dark face, stained by the tarnish of his beard, was sacastically malevolent. "We've got a fortune in skins out there we want to take to Earth. One of your medics came aboard, jerked about all of our crew."

"Before you got here," Nissen, the pathologist interposed, "I went aboard to see Blackbern's men. Nordheimer was getting so impatient I began to worry about what he might do to you."

"I don't think he can hurt me officially," Dave said easily. "What about the crew?"

"Orya fever, ninety-five per cent morbidity rate. Bacterioscope reveals it in their blood; profound toxemia on the hemospectroscope. They'll all have to stay in isolation until cure is effected. The inner fittings of the ship will have to be burned. I checked the pelts but they can be decontaminated in the gas house."

"You don't touch that ship or those pelts." Blackbern's face flamed with anger. "I've got a right to talk, too. I'm telling you I'm going to Earth to sell those skins—"

"Shut up!" Dave's voice was suddenly explosive. "I run this station—"

"Why you little test-tube washer." Blackbern's arm swept out, pushed the men back, away from him, he came forward, a black, enraged animal, fists like lead ingots whirling madly. Dave saw it, saw the frustrated hysteria in the man, sidestepped the blow with the ease of a professional dancer, for all that he was incased in heavy armor. He caught the raging man's arm, whirled him over his shoulder to fall stunned and helpless at his feet.

He winked at the grinning men. "He didn't know that we test-tube

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washers, softies that we are, have to exercise at 3-Gs one hour every day." He looked at Blackbern's stupefied face. "Get up," he ordered curtly, "we're medical men, not marines."

Blackbern crawled heavily to his feet. His venomous eyes were more respectful. "You going to check my ship," he hesitated, added grudgingly, "sir?"

Dave flicked the wrist switch of his armor. Gears whined in its metallic flanks as it bivalved. He stepped out, shook the creases out of his uniform. "I'm going to check the spacemen first."

The patients, thin, wasted caricatures of men lay in their bunks in the isolation ward, watched him with anxious expressions in their deeply socketed eyes.

Corpsmen, clad in contagion-free gowns, were setting up the steribanks. Nurses were briskly inserting needles into the veins of the cubital fossa, sterilizing their blood, adding amino acids to the nutrient to speed recovery.

He stopped by one of the bunks. "When did you first get sick?"

The spaceman's voice was a harsh croak. "About six weeks out of Halseps. Nothing but processed food to eat. Air went foul. Too much work . . . holding the ship together. No medicines . . . air ducts corroded through . . . no circulation—" The voice trailed off into sleep.

It was the typical story of a tramp freighter. He continued with his ward rounds: offered the cheering confidence of an early recovery to the patients; cautioned corpsmen against carelessness.

Before he was through, a messenger came to him with a note from Thurman: "Nordheimer has just put through a call to the Chancellor's Office protesting his needless delay."

Dave swore softly, balled the note, dropped it in the flame chute of a decontagion basket. He turned to Dr. Nissen: "Conduct the Guard Office, tell them what we have here. They may want to hold the captain for improper conduct. When the skins are clean, call the Finance Division of the Colonial Office so they can arrange an auction for the skins. I'm going out to check the ship."

The interior of the *Canaberra* was a rotten, rusted mess. Eroded hull plates allowed air seepage so the atmosphere generators were constantly overloaded. In consequence of the lowered oxygen tension the men had suffered debilitating, chronic anoxemia. Air ducts were fouled so that circulation of even vitiated air was impossible. The sewage disposal plant had broken down and filthy sludge filled the under decks.

He shuddered to think of the social conditions at the periphery of man's empire. The crew's quarters were a stifling miasma; it was a wonder any of them lived to make Earth. The holds of the ship were filled with untreated nalyor skins, which in spite of their filthy condition radiated the glowing platinum beauty which made them the

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most beautiful pelt ever seen in the astrosphere.

Dave summoned Blackbern. "I'm condemning your ship. It will be taken to the hulk yard and broken up. You may protest this action before the Domain Board. This condemnation is for the public." He ignored the vituperative response.

The ground crew attached cables to the overtop shackles and tugs lifted the freighter from the cradle.

Instantly, it seemed, the sleek lines of the *Starry Maid* appeared over the cradling table. Its polished hull gleamed like living flame.

The landing crew grabbed anchoring lines, passed terminal hooks through the ground eyelets. Winches in the landing compartments of the yacht turned, tightening the lines and as power was released from the gravity plates the ship fell slowly into the bassinet.

The landing lock opened and two figures came down the ramp.

Dave blinked his eyes.

Never had he seen such space armor. The helmets were domes of jet; the wearer could see out through the uni-transparent metal but he couldn't see within the cover. A Red Cross of inlaid rubies flamed brilliantly on the chest of one of the figures. A blaze of diamonds monogramed J. N. flickered on the left breast of the other armored figure. Scrolls of gold foamed over the arms and shoulders of the armor.

"I'm Dr. Mortimer J. Mortimer, Senior Surgeon of Nordheimer & Company and Medical Officer of the yacht—"

"Which of you is which?" Dave looked from one dome to the other. How in the name of deep space could they expect him to know which of the slender figures was speaking.

The figure with the jeweled medical cross stepped forward. "I wish to protest our long delay. A hulk like that freighter should not be seen ahead of Mr. Nordheimer. I want you to bring up litters and remove our patients at once."

Dave listened to the contentious voice with amused incredulity. "Look, Doc," he said after a long pause, "this is Exotic Disease Control. If you think you have something serious enough for isolation, then it must be serious enough to warrant potential quarantine of the entire ship. Suppose we see the patients first."

Dave walked up the ramp. As the panels closed the diamond monogramed figure disappeared into another compartment. Dave watched curiously as the other figure stepped into a metal frame which unhinged the armor. At the sight of its ornate, padded interior he wondered with a perverse sense of humor if the motors of the suit weren't gold plated and the air ducts lined with platinum.

"Whatcha got?" He asked after introducing himself.

Dr. Mortimer J. Mortimer's arrogant face puckered into a haughty frown. "Now really. I don't know. I'm not a planetary epidemiologist. That's your field."

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"What're their symptoms?"

"It's a loathsome thing; changes their personality." Dr. Mortimer J. Mortimer delicately touched the waves of his beautiful blond hair. "I'll tell you about them as we go to their quarters."

He led the way through corridors tesselated with fabulously beautiful paneling, over carpeting as soft as rubberoid foam. Intricately engraved doors opened at their approach, whispered softly as they closed behind them.

"It had an insidious onset. They became weak; at first we thought it sheer laziness, so many spacemen are, you see. It's a big problem on many of our outer nuclei freighters. You'd be surprised at all the difficulty our captains have with the bums. I have an entire department just—"

"Never mind the economics of your job," Dave cut in sharply, "how about your patients now?"

Dr. Mortimer J. Mortimer turned, stared insolently at Dave. "The malaise I was speaking of appeared like laziness. I insisted the captain work them harder. I realized they were ill with some strange malady when they started developing a rather alarming glossitis. Their mouths and tongues were inflamed; dysphagia was quite pronounced. They are now having difficulty in even swallowing water. Then their skins started turning that loathsome green color. I knew it was serious and of course isolated them at once; had a special air filter rigged, it's really quite a work of engineering art. I'm thinking of writing a paper on it for publication in the *Journal of Spatial Medicine.*"

"What? The air filter or the men's illness?" Dave did not even try to hide the derision in his voice.

Dr. Mortimer J. Mortimer ignored the scorn in Dave's voice. "Their hair got brittle and started falling out and their nails became ridged. As you will see they are wasting rapidly from a profound toxemia. We must have them off at once. I can assure you none of us have become infected."

They passed through the crew's quarters, stopped abruptly at its welded door. Some spacemen wheeled up a portable lock, started fastening it to the paneling.

"How've you been feeding these men?" Dave wondered.

"I put a corpsman in with them, gave them processed food. Of course I haven't gone in there. I couldn't risk infecting Mr. Nordheimer or Janith with anything."

Dave wheeled in the yacht's diagnostic equipment; exquisite medical instruments which made him writhe with professional envy.

The warm odor of congestion, like an unaired gymnasium, filled his nostrils. The bunk rooms were packed to the ceiling with sweating, miserable, palpably ill men.

He examined their yellow-green skin carefully; looked long at their reddened, swollen tongues. All of them were afflicted with the same type of disease. He examined blood under the bacterioscope. No organism caused their illness; the toxemia came from the waste of their own body. They were weak

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from sheer anemia. He raised his head from the hemiglobinometer, dark fury in his eyes.

Dr. Mortimer J. Mortimer was leaning against the bulkhead, oblivious to the hostile stares of the men. "Well? What do they have, Munroe?" He asked indifferently.

"Chlorosis! Simple spatial anemia. Due to lack of protein in their diet."

"That's what I told him," a gray-haired spaceman muttered angrily. "Processed food is all they gave that bunch. We regulars ate good, them got nothing."

Dr. Mortimer J. Mortimer straightened abruptly. "You don't certainly expect them to eat like Mr. Nordheimer or the officers."

"By deep space," the spaceman growled, "they should be fed something besides bread and vitamin tablets, even if they are working their way back to Earth." He looked at Dave. "And we could have a doctor on this ship, too."

Dave knew the spaceman's knowledge of hematology had not been learned from textbooks. It had been learned the hard way; from dietary experience in deep, black space. If Dr. Mortimer J. Mortimer had not been so indifferent to the health of the crew, he would have insisted that they be fed a more adequate diet; aborted the illness before it ever started. He recalled what Dr. Russell had said about the moronic mind of the *Starry Maid's* medical officer.

"I want to speak to the owner," Dave said.

"I hardly believe Mr. Nordheimer would care to speak to you." Dr. Mortimer J. Mortimer said rudely. "After all, you know he just doesn't see anybody."

"I'm not just anybody." Dave's eyes narrowed angrily. "I'm speaking for the public. I insist on seeing him."

"The public," Mortimer laughed scornfully. "Mr. Nordheimer is not interested in the public—"

"But I am," Dave broke in, fury in his voice. "I'll see him if I have to tear these bulkheads down with my bare hands."

Dr. Mortimer stepped back at the sight of Dave's icy, angry face. He darted a quick look at the smirking spacemen. "You public employees certainly have an hypertrophied sense of responsibility." He tittered self-consciously at his clinical analysis. "Very well, I'll take you to see Mr. Nordheimer, but mind you don't expect a kind reception." There was condescending mockery in his voice. "At least you'll see the grand salon and that is more than most people ever do."

Dave followed the slender doctor to the grand salon of the ship.

He stopped abruptly as he stepped in. Eyes widened in unashamed, breathless wonder. Never had he seen such an impressive sight.

He was looking at the Macro-Mafintic Falls of Zaragahn, Sirius' great planet. He recognized it from teleposters. Now he was looking at its captured reality. It was the most magnificent sight he

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had ever seen; unutterably breath-taking in its majestic beauty.

Mountains, glittering with snow, vanished into an illusory horizon, water from a mighty river burst forth to fall for twenty-five thousand meters into a narrow, tortuous canyon. But three-quarters of the way down, up-sweeping wind caught the watery shaft, tore it into mist, whirled it cyclonically upwards. Electrostatic charges formed on the droplets to be neutralized by vivid electric discharges and through the mist, jagged lightning flashed ceaselessly and the deep throated rumble of thunder echoed in the mountains.

Dave had heard the sight of the Falls rivaled the splendor of Sirius' incredible, tumultuous prominences. He could believe that now.

Man lacked the multiple perceptive ability so necessary to appreciate the tremendous forces in a solar storm. His sensual comprehension could not grasp and hold for cerebration the magnitude of the incredible, flaming vortices that writhed and twisted millions of miles above Sirius' churning surface.

The Macro-Mafintic Falls can be adequately appreciated for all their majestic worth. It captures perception through senses that are instinctively familiar. Man has crawled on the slopes of mountains; felt the vibrating wonder of their creation. He has seen clouds form, felt the coolness of their mist; been thrilled by their rain. He has seen and felt and feared the lightning; trembled with wonder at the crack of thunder. He had built dams; listened with smug satisfaction as a tamed river roared its spilling protest. This, then, was but the infinite magnification of an age-old experience.

He looked on in wonder. The Falls seemed to strike on a churning violet cloud that billowed and swirled over a foundation of lightning before it fell into the incredible gorge.

The room was built on a promontory jutting out over a wide, deep chasm. A fireplace, burning golden apple wood, crackled behind him and the air was spicy with the tangy, piny freshness of high mountains.

Dave walked to the rail, looked up at the snow-capped peaks. Impossible to believe this sublime scene was but the three-dimensional art of a photographer. It was too dynamic. The flashing lightning, the rumble of thunder, the roar of the Falls, muted by distance was too real.

It required actual mental effort for him to realize he was not standing on a real rock on Zaragahn looking at the Falls; instead he was in the grand salon of a sumptuous yacht, now resting in the landing cradle of Exotic Disease Control.

"Are you sight-seeing," an irritable voice snapped, "or did you want to see me?"

Dave whirled and in a flash was conscious of Mortimer's condescending sneer and the thin, vulture face

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of Mr. Nordheimer regarding him with cynical, beady, black eyes.

"I've just examined your crewmen," Dave announced flatly.

"That's kind of you," rasped Nordheimer, "now take them off so we can Earth. I've waited here long enough."

Dave faced the fabulously wealthy, almost omnipotent Nordheimer with the slightest trickle of fear welling within him. Stories of his greedy love of power had seeped into the smallest colonies of Earth's empire.

He had once hurled the might of his private spatial force on a planet because it failed to recognize his economic power. It was whispered that on the planets of the periphery he was worshiped as a god, a devil, an emperor; that one planet was his arsenal of empire; devoted exclusively to the manufacture of weapons to keep him in power. That some day he intended to be the master of the world.

"No!" Dave said, "their illness is not infectious; they do not need to be removed."

There was a tormenting moment of intense nervous tension in the room. Lightning from the Falls tinted the walls vivid violet and the roll of thunder, like an oncoming storm, was a menacing rumble.

Nordheimer settled deeply into a low, spun metal divan. Corrugated lids closed slowly over his venomous eyes. A cynical smile curled at the corners of his thin, bloodless lips. "My doctor said their illness was infectious; that is enough for me. I tell you now. Take those men off and at once. That is an order."

"No!" Dave's voice was curtly emphatic. "Your men suffered from protein starvation; they became anemic with a disease as old as Earthly immigration Chlorosis. You picked those men from some planet, brought them back here to save yourself the cost of a regular crew. I will inform the Immigration officers of this and they will remove and treat your men."

Nordheimer's brows met in a satanic V. His thin, irritable face reddened ominously. "You infer my doctor was wrong."

"Your doctor," Dave answered, turning to Dr. Mortimer J. Mortimer, "is an incompetent moron."

"You can't say that about me." Mortimer started forward.

"Shut up!" Nordheimer growled. "He's probably right." He looked up at Dave, slowly without moving his eyes from those of the doctor, reached out for a platinum trimmed glass. A clawlike hand brought the glass to his mouth, he sipped slowly, hypnotic eyes looking steadily into Dr. Munroe's. "Do you refuse to take those men off this ship?" The glass was held close to his mouth.

"I do," Dave said steadily. "Exotic Disease Control is run for the public; not for the whims of privileged groups."

"The public." Nordheimer snorted. "Who cares about them anyway—"

"The Public Health Service," Dave retorted angrily.

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Nordheimer set the glass down, pulled a wallet from his pocket, extracted a thick sheaf of hundred stellar notes. "Take this and buy yourself a present. I'll—"

Dave started towards the door. "I will release you at once, Immigration will expect you in thirty minutes."

"Come back here." Nordheimer whirled to Mortimer. "Summon the captain."

"What's the matter, father; found something you can't buy?"

They turned at the throaty voice. Janith Nordheimer was standing in an open panel. Dave recognized her from the numerous picture magazines. She stepped out, walking the length of the compartment with a lazy, free stride. Viewing her this way, Dave could appreciate the groomed perfection she represented. She was wearing a loose, knee-length coat of shimmering metallic material, drawn tightly about her waist by a braided, metal belt ending in thin gold tassels. It was a costume designed to display the flawless symmetry of her beautiful figure. She sauntered to a taboret, touched a pedal on the tesselated deck with the toe of a diamond encrusted shoe.

"Hate that view," she said as multiple panels formed to screen the view of the Falls. She rested her elbows on the back of a chair, regarded Dave, an insolent expression in her dark, sophisticated eyes. "Protecting the insensate mob, watching the helpless public; you must have studied the manual of the Juvenile Planeteers. I understand they do things like good deeds and such."

Mortimer snickered, clapping his hands together happily. "Munroe," he giggled. "Munroe the Noble."

The captain of the yacht came in at that moment. "You sent for me, sir?"

"Yeah." Nordheimer jerked his head at Dave. "This bacteria engineer orders me, *me* to take my ship over to Immigration and have them put those patients in bed and I would have to pay for that, besides having all of the hoi polloi on Earth knowing where I'd been."

"Yes, sir," the captain said deferentially. "You will remember, sir, I advised you that landing at Exotic Disease Control, unless we had some really infectious disease, was dangerous—"

"Who cares about it being dangerous," Nordheimer sneered. "Toss this germ mechanic—"

"Germ mechanic." Dr. Mortimer discharged a bellow of laughter. "That's a good one, yes sir, that's really a good one, germ mechanic. I'll have to remember that one—"

"Shut up when I'm talking," Nordheimer rumbled. He turned back to the captain. "Toss him off the ship, and I don't bother whether he has armor or not—"

"We're too close to Earth for that now, sir," the captain interposed cautiously. "All he has to do is raise his hand, speak into his wrist communicator and we'd be blasted by the Guard before we

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could raise the Chancellor's Office."

Janith Nordheimer chuckled. "But he would be blasted, too."

"That's right," the captain admitted, "but he is at Exotic Disease Control. The doctors of the Public Health Service ordered here are conditioned to expect death. It is part of their duty. I'm sure the doctor would rather die by a neutron blast than by a disease he is sure to get from some derelict from the outer nuclei."

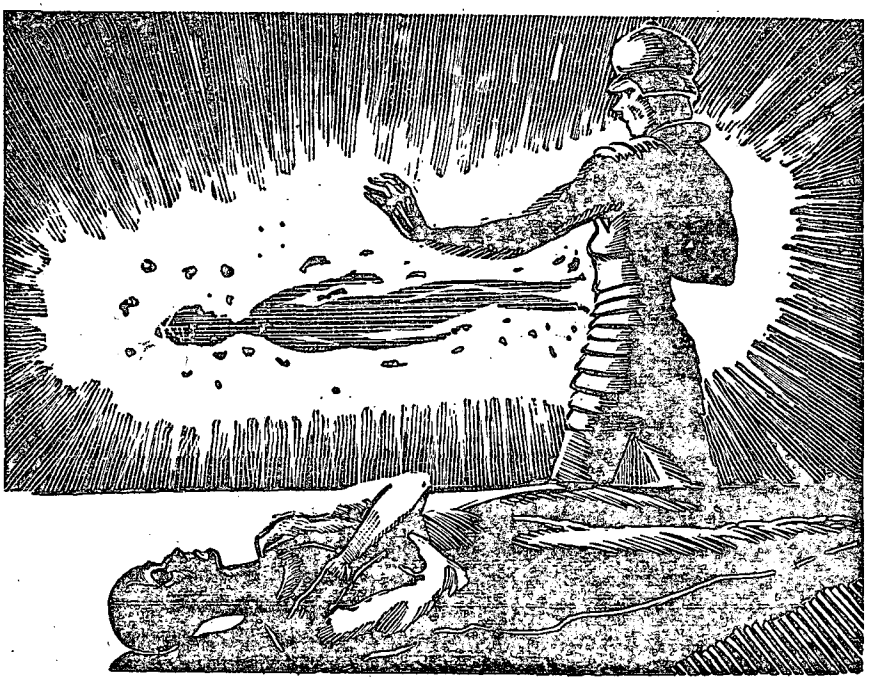
The Nordheimers looked at him with new formed respect in their widened eyes. "We'll go to Immigration," the man said hastily. He whirled on Dave. "Understand one thing, you mention one word of this conversation officially and I'll have your job."

"Why, Mr. Nordheimer," Dave hoped his expression showed astonished wonder. "I didn't know you needed employment."

The last thing he heard as he started down the corridor to the lock was Janith's taunting laugh and her sneering admonition he had better be very, very careful from now on.

He told the doctors and the chief about the scene. "The Old Boy is a power," Dr. Nissen pointed out in a worried voice. "He has lots of rocks in the sky, he can control Planetary Congress and they dictate to the Chancellor."

"But they are all afraid of the public." He shrugged his broad shoulders. "Well, there's nothing to do about it now. Let's go on



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to Blackbern's patients." He stopped, placed a hand on Nissen's shoulder. "Of the two personalities, I admire Blackbern's stupid ruthlessness much more than the calculating cruelty of the teutonic minded Nordheimer."

Dave was in the A & R checking welds in his armor when Operations summoned him on the phone. "Get on the closed channel, the Director of the Inner Port wishes to speak to you privately."

Dave made the contact in his office. "This Munroe, Exotic Disease Control. Duty Officer requested I contact you on the closed channel."

"Can your side be seen or heard in?" the director asked cautiously.

Dave read off his settings, the director seemed satisfied, for he said at once, "Nordheimer is mad at you. He put pressure on the Chancellor, the cabinet met in secret session and are drafting a bill to limit the power of the Public Health Service. Nordheimer said he'd just be satisfied if they get rid of you. What happened?"

"I made him wait while I took care of some sick patients from a freighter."

"He's spreading some nasty tales about you. Something about accepting a bribe and insulting his daughter and calling his medical officer an incompetent fool—"

Dave laughed. "The last part is true. However, when I went aboard I was wearing an open wrist phone, everything that was said is a matter of record. I sent it to the Earth Office with my own comments."

"If they can't get you legally, he'll do it some other way."

"I've been expecting something," Dave admitted. "But all they can do is kill me."

"Don't be so resigned," the director snapped.

Three days later as the setting Earth was casting long shadows across the crater floor his dread was crystallized into reality.

He was standing by the ramp talking with the senior medical officer of an exploring battleship which had just slid out of the velvety sky to unload a pet for bacterial evaluation.

He laughed as the brontosaurus-like creature in its glassite cage was wheeled down the freight ramp. A thought flashed through his mind, amusing in its perversity. Nordheimer should have such an animal for his doctor.

The gong of the phone in his helmet was startlingly explosive. "Duty Officer on Operations Channel." He muttered a hasty excuse to the doctor, walked over to the portable screen, plugged his phone jack.

"Duty Officer speaking. The *Marston,* a freighter, lost for over two years, has been found out near Pluto. The ship is owned by Astrosphere, one of the Nordheimer Companies. Nordheimer requests a complete inner examination of the ship.

"The Public Health Service said an emphatic no. They could see no reason for risking valuable person-

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nel. The company officials went to the Secretary of Spatial Commerce, stated the *Marston* had been sent on a voyage of commercial exploration and it was essential that only the log be secured but the condition of the cargo be determined and the salvage possibilities of the ship. You'd have to go deep inside and make a determine. This order is for the public."

Dave flicked off the phone with a wry grin. So this is how Brother Nordheimer acts when he's crossed. He realized with cold objectivity this action on Nordheimer's part was essential if he wished to continue in economic power.

Nordheimer could not attack him with his secret police; their altercation had been made public now and the mass of the people would rebel against such a militant action. He was doing it cleverly, by seeing that he went into a ship with a high death potential.

He checked his armor minutely. Ran in new air lines, lights, communication circuits, even replaced the bearings on the blowers. He remembered Blackbern's crack about broken welds; never left his armor alone. He charged his own physiology with every known immune vaccine, serum and bacterin. He spent his free time studying Pyter's Index of Extraterrestial Diseases.

When Operations called, announcing the tugs would cradle the freighter within an hour, he felt himself as ready for battle against the Unknown as he would ever be.

Dave armored himself, summoned the various crews who would help him make primary entrance, walked blithely out to the landing cradle.

He was not surprised to see the two armored figures of Dr. Mortimer J. Mortimer and Janith Nordheimer watching him, taunting smiles on their derisive faces. It intrigued him they would leave off blank helmets to be certain he would see and recognize them; know to the fullness the bitterness of certain defeat at their hands. He would have felt let down if they had not been there.

He hid his galling frustration behind a mask of insouciant laughter. "Hail, Nordheimer. I who am about to die and stuff salute you." There was mockery in his derisive salute.

"I'll pull you from this detail if you'll agree to be conditioned to work for father." Janith directed her voice on a light beam so it could not be heard by her companion.

"Thanks for the offer," Dave said quietly. "But you see I'm a physician."

People from lunar stations were assembling about the cradle in a vast semicircle; gathering with the morbid fascination only impending catastrophe or violent death can induce. Dave looked at them in their varied armor, could not help but laugh at the neuroses which motivated such behavior.

He turned on the open communication circuit so all could hear him. "Now hear this." He raised his

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voice, realizing as he shouted that he was betraying tension; instantly channeled his mind into precise, frigid patterns. "Now, hear this," he ordered quietly, as if directing one of his crews. "No one is to cross the limiting lights set by the tower. This order is for your protection." He looked at Janith and Mortimer. "This order is for you, too. Get back at once."

He walked to the landing cradle as tugs appeared overhead holding the *Marston* in the grip of unyielding tractors. In the bluish Earth-set the vast, insensate freighter was ominously menacing. Dave looked up at its corroded, curving sides and could not help but shudder at the thought of the grisly things he would find in its black interior.

The steri-crew was wheeling up vortex guns, tractor banks, flame generators, acid lines and the tools necessary to make entrance to a derelict. Dave was aware a hush had settled over the crowd. The thin, distant murmur of noise from a thousand communicators had become a portentous silence now.

They were waiting with avid interest for that breathless moment when he opened the locks and entered the ship. They could hardly wait to hear what he would say about his findings. He knew some of them were growling impatiently at his cautious preparations, grumbled at his exterior inspection.

The chief rolled up the portable bacterial wagon. Dave stood still as the medical kit's tractors and repellers were balanced, brought to focus on his back. He took a few steps to test its drag. "Lighten it by fifty kilos," he directed. "I might have to climb and, chief, set the automatic neutral so I can step around and back without unfocusing. I don't want to chase the thing over the lunarscape to find a test tube."

He walked slowly up the ramp, moved along the blackened, rusted keel. In some distant past the ship had rested on a planet's earthy surface; frozen earth cracked off at his touch.

Instantly he melted the dirt with a hand torch. A crumb of dust, loaded with an unknown virus, could settle in a joint of his metal shoes, infect the station. He took tweezers, teased off a few clumps, put them in solution, centrifuged, read the organic indicator on the bacterioscope, sighed with relief. The stuff was sterile. The actinic power of solar radiation had killed any organisms clinging to the ship. He took a larger sample for the geologists, turned to the landing room.

He took hold of the recessed handle, turned and pulled. The door was frozen closed. "Set up a vortex, center it on the door, pull the door and as the air explodes out turn to full temp."

He stepped back, turned on his suit to full reflection so as to avoid external heating. The crew aimed their whirling flames at the door, tractors penciled at the handle, the door tore open with a grinding vibration, felt even through his cushioned shoes. Air expanded out,

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was caught in the whirling vortex, heated instantly to its ultimate limit.

Dave stood on the deck of the entrance lock. He flashed his light on the rusting bulkheads, on winches oxidized by time, on armor, long since obsolete. He looked at the ship's design on the wall, studied the passages, corridors, location of offices and holds. He went back out, picked up a power cable, plugged it into the ship's emergency line. The ammeter showed a tremendous drain, but no lights flashed in the compartment, nor did his own circuits break with overload.

He pushed the handle of the winch to see if he had power there, but the handle crumbled to flaky dust in his grip. He took a scalpel from his mobile kit, scraped at the door and the metal cracked and peeled with brittle weakness. "The interior metal is about as strong as tin foil." He made the announcement surprised at his own calmness. "Call for the consulting metallurgists."

He found the automatic log, the device which recorded all the captain's orders, messages and directives to his crew, unfastened it from its niche, dropped it in a sterilizing bath, handed it out to Thurman. "I noticed their last entry was they were leaving the Cepheus nucleus. That's a hard white area, so we can expect a most virulent type of organism. Flame before opening."

"Are you really going inship?" Thurman asked anxiously.

"I must, it is orders."

He pushed on the door leading inship and the panel crashed inwards. The metal had the tensile strength of decayed wood.

Curiosity had not erased his natural fear or conquered his vague apprehension.

As he walked gingerly up the long corridor he had the spine-tingling sensation that someone was watching him and that at any moment one of the panels would slide back and someone would step out and asked what he was doing in their ship.

"I feel crazy," he said aloud.

"You all right, sir." It was Thurman's voice, it sounded faint, alarmingly faint.

He shivered with expectation as he rounded the corridor and started up the ramp towards the fifth deck. He felt the tug of the kit behind him suddenly slacken and he whirled abruptly to see his mobile unit careening madly back down the ramp. It hit the bulkhead, crashed through its friable metal, vanished into the cave it created.

At the same instant he was aware that his light was growing steadily dimmer and the air in his suit was stifling. He looked at the instruments on his left wrist. He could feel the pulsating throb of laboring motors in his shoes. They were pulling current, acting as though they were being shorted out.

That was what had happened to his kit. The tubes had blown from an unexpected surge. Every in-

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stinct told him he should go back and tell the Director General of the Public Health Service to shove his activity into deepest space and keep it there. The discipline that came from years of training was greater than instinctual protective mental mechanisms.

He stopped in the center of the corridor to adjust his air machine. He turned off his laboring motors and set the emergency bellows in his suit's flanks. As long as he walked they would circulate air, but he couldn't stand still.

Then his lights went out.

He stopped, petrified with fearful, startled surprise. He started gropingly to retrace his steps, trying to remember each turn he had made when he became conscious that the bulkheads, the overhead, even the deck were emitting a faint golden glow and as his eyes became dark-adapted he discovered that he could see perfectly well. He forced himself to continue up the ramp and through the corridors.

He came to it!

The panel he dreaded, hoped to reach. The entrance to the crew's quarters.

He pushed through the friable panel. Stopped! Abruptly!

Sweat oozed from his brow, dripped down his back. Sweat formed on the palms of his hands, made them damp in their sheathed gloves. Nausea gripped him. The crew, all of them were here!

They weren't the macabre, decayed sight he had expected to find, actually hoped to find. They laid in their plastic bunks and their unclothed bodies were semitransparent and they glowed with a lambent flickering radiance. Their features were vaguely discernible. He experienced the eerie sensation they were turning their heads, observing his every action.

He forced himself to the side of the bunk. Pushed out his sheathed hand, touched one of the things. Instantly he felt a shock. A shock as though an intense surge of pure energy had leaped through his entire organism and stultified his brain. It was painful in its intensity, exquisitely pleasant in its cortical suggestion.

But the touch itself had done something of unutterable wonder to the body.

The light playing through the human remains flickered violently, vibrated with intense nervous energy as though his touch had disturbed a primal balance. Then, the body vanished in a flash of coruscating fire and a tiny ball of flame, almost microscopic in size burned on the plastic bed frame.

He touched another body, watched it coalesce into condensed living energy, felt the same orgiastic sensation ripple through his brain. He started to laugh, was aware that he was laughing, looked at his hand, giggling at the flame which leaped from the metal sheathing his fingers.

"The ultimate bacterial form; the pure electric protein. I've found it," he shouted. "Bacteria of pure energy." He jumped up and down, clapping his hands in joyous

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abandon at the concept of his thought, distantly aware of his euphoric insanity. He knew, too, that what he had found was a long anticipated discovery.

It was a mathematical certainty it would be found. The medical physicists had expected to find such a life form as soon as they realized the verity of atomic energy. A life principle that by-passed the usual organic methods of existence, took their energy, without clumsy digestion, absorption, detoxification and evacuation, directly from the primal source. It was the ultimate of bacterial evolution.

He knew in the deep wells of his mind that his actions now were a result of short circuits in the thalamic synapses, that the pyramidal cells of his cortex were being subjected to an intense radiation. Just as it had drained the current from his motors, shorted out the intricate hookups in his medical kit, it was even now destroying the delicate fabric of his mind.

The living neutrons of coalescing flame whirling in semiorganic patterns were absorbing the energy pouring into the ship. They were multiplying in number, growing in strength. They would ooze forth through the metal their activity had decayed, fall on the landing platform and there, subjected to the intense solar radiation, they would utterly destroy his station and all that it meant.

Through the cloying mist forming through his mind the basic pattern of normal conduct was still able to assert itself. He remembered the public!

Dave stared down incredulously at the lambent flame eroding the fresh metal of his armored hands. He experienced a rising fury that a sentient bacterium should so fog his mind. Thalamic rage, instinctive rather than intuitive, surged through him.

He pulled the steri-gun from its sheath, pointed its needle muzzle at the deck, squeezed the grip. Livid flame struck the deck, splashed about his feet, tore through the friable metal, volatilized girders weakened by disease, tore through the next deck, fountained on the one beneath that, burned out through the ship to volcano on the metal landing platform, in a burst of energy that lit up the lunascape.

He looked down through the gaping hole, turned his tortured vision to the flaming erosion of his hand. Slowly, deliberately, as though he were drunk and had to carefully reason out each motion, he transferred the gun, pointed it at the infected arm and convulsively fisted the hilt.

There was a long, long moment of unbearable pain, of agony so great it taxed his wavering sanity to experience the tremendous burst of impulses bombarding his mind. The dark curtain of shock was shrouding his brain as he leaped into the hole he had blasted.

He opened his eyes into instant, alert consciousness. He turned his head, integrating himself with his

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surroundings. Dr. Nissen with a corps of nurses were watching him with that professional detachment which comes from years of practice. Nissen slowly came over to his bed, withdrew an infusion needle from his leg.

Then he experienced the impact of memory. He raised his arms, looked down at the right hand. He had expected it to be there, was actually surprised to see it. He flexed the fingers, rubbed their tips across the coverings of the bed.

He knew then it was a cleverly grafted prothesis, as good, well almost as good, as his own arm and hand had been.

"How long?" He was surprised at the timbre of his voice.

"Three weeks," Nissen replied. "We did the surgery at once; kept you out until we were sure the grafts took."

"Grafts?"

"You burned your feet off with your steri-pistol."

"Oh—"

Nissen sat on the edge of the bed. "We got a classification on the stuff. It's an organism, lives by synargism, derives energy of existence direct from photonic energy. It'll live and multiply on anything with a metallic or electrical structure."

"What did you do with the ship?"

"We sent it into the sun. You made quite a name for yourself. Hero, you know, trying to destroy yourself for humanity. Nordheimer even sent you flowers. Blackbern sent you a skin. Sorry about your feet, but you know. It's for the public."

"Yes," Dave said slowly, feeling the awkward heaviness of his prosthetic extremities. "I know. It's for the public."

THE END.

IN TIMES TO COME

Next month, Lewis Padgett begins a novel with a decidedly different and interesting motivation: the hero's efforts are directed toward setting off the atomic bomb, causing an atomic war, and blowing his civilization to pieces—for the good of civilization!

It's a highly interesting and thought-provoking yarn. The essential theme of the story is, actually, that there are a number of things worse than an atomic war, and not the least of these under the right—or wrong!—circumstances is permanent peace!

Also—Willy Ley has a discussion of how much improvement could be made in V-2 with very little change. It's a highly interesting, detailed analysis of the physical structure of V-2.

THE EDITOR.

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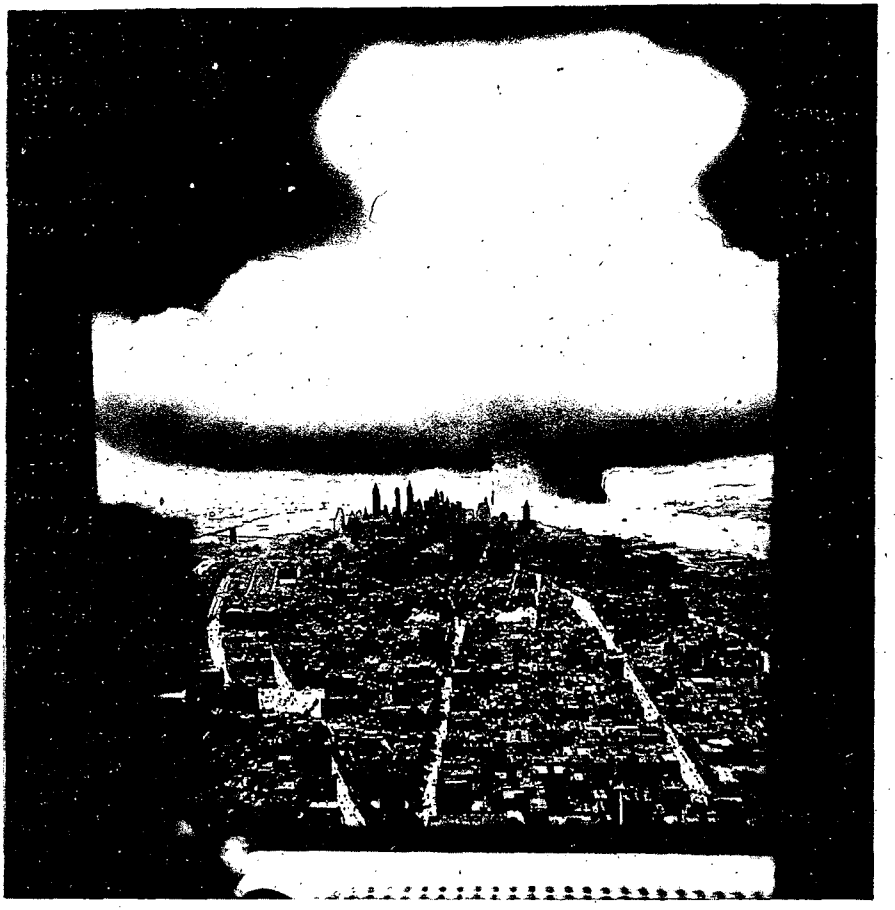

BIKINI A AND B

BY JOHN W. CAMPBELL, JR.

***Concerning** two bomb tests—and the first catalogue of synthetic atoms ever published! Usually, synthetics are designed to wear better than natural substitutes, but in atoms, the synthetics are more valuable because they're poorly made. They break down in a short time!*

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Tests A and B have been carried out. The reports on the two tests carried out at Bikini are beginning to appear at the time of writing; the more complete reports will be released later.

However, there follow two items of atomic interest; first, the official report to the President, prepared by the President's Evaluation Commission, the second is simply a price list. This magazine does not ordinarily function as a catalog service, but the particular nature of the commercial products offered we deemed of sufficient historical interest to merit publication. If you're interested in buying a few atoms—strictly synthetic, not as good as the natural kind, because they don't wear as well—the prices are listed below.

In addition to the official Evaluation Commission report, some degree of background to understanding of the atomic explosion is needed. There is an inherent difference between the explosion of 20,000 tons of TNT and the explosion of an atomic bomb—one newspaper report said 3.5 pounds of plutonium, but my personal guesstimate is that that's low, by a factor of about 3—as mentioned in the official evaluation report: TNT doesn't produce, in sea water, the equivalent of hundreds of *tons* of radium. Some other vital differences are not mentioned.

For a moment, let's shrink to an atomic viewpoint, and look at a piece of steel, a piece of diamond, and a droplet of mercury. From the vantage-point of atomic-size vision, the piece of steel consists of roughly spherical things arranged in rows, files, and columns, for the interatomic forces in the steel molecules—actually iron molecules—are binding the atoms into crystals. Free outer-orbit electrons drift from atom to atom—the conductivity electrons of the metal, that permit it to carry electricity.

If we start moving in on these atoms, however, their appearance changes. The electrons in an atom do *not* move in orbits, one behind the other like sausages on a string. Modern theory indicates the electrons in the atom form shells of electric and other forces about the nucleus—strange shells which, if pricked, suddenly collapse into the familiar electron particle. These clouds of electron shells about the atomic nucleus are, in the view of a nucleus, about as solid as a cumulus cloud—they'll stop light, and will bounce back something as light as another electron, but they are no more obstacles to a fast-moving nucleus than a heavy cumulus cloud is to a B-29.

The trouble with these tenuous electron clouds is that, like the famous clouds of the India-China Hump route, the clouds have rocks in 'em. The atomic nucleus is small, but extremely dense and massive. (The density runs up to the unimaginable heights approached by collapsed matter in the heart of a dwarf star.)

For a moment, let's watch the atomic reaction between a stray neutron—released somewhere by

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an accidental cosmic ray—and a U-235 or Pu-239 atom. The neutron, driving along at a modest 10,000 miles a second, drives through the electron cloud of a carbon atom in the steel, hits the carbon nucleus, and bounces violently. A nucleus is the most rigid, most powerful structure of force in the known universe—except for the ultimate rigidity of the nucleons, the protons and neutrons, that make it up.

The recoiling neutron bounces away, and heads toward the mass of U-235 atoms inside the steel case. It plows through the electron cloud of one atom, unaffected by the ghostly electrons. It misses that nucleus—and a hundred more—before it makes a dead-center hit on a tiny uranium nucleus buried deep in its electron cloud. The force of the blow doesn't damage the U-235 nucleus, or even inconvenience that enormously rigid structure.

But the rigidity of the uranium nucleus is a strange thing. The nucleus of an atom is like a drop of water on a greasy surface, rounded up by surface tension. The nucleus is held together by surface tensionlike forces, highly elastic forces of such enormous magnitude that they constitute practical rigidity—to most things.

But just as a water droplet on a greasy surface will, if it touches a chip of soap, wet, then ingest it, so the uranium nucleus will "wet" the neutron that touches it.

The violence of the blow does not matter; a uranium nucleus can stand the terrific violence at the heart of an atomic bomb without inconvenience. If the nucleus is struck a direct blow by a fission-product nucleus driving with a force of 70,000,000 electron volts, the two nuclei simply bounce, the "unstable" uranium nucleus quite undamaged.

The one thing that *does* matter is that a neutron is a type of force-field that a uranium nucleus will wet, and so incorporate into itself.

Immediately, the ingested neutron causes acute indigestion. The neutron is, because it has mass, a packet of energy. In absorbing it, the uranium nucleus has absorbed a huge quantity of energy, an amount of energy which appears as a violent rhythmic pulsation of the water-droplike uranium nucleus, as it tries to readjust itself to the new situation.

Actually, a U-235 atom which absorbs a neutron *can* readjust successfully. If the nucleus does so successfully, instead of fissioning, the U-235 nucleus discharges a gamma ray quantum of about 4,000,000 volt energy, representing the unassimilable excess of energy the absorption of the neutron added, and settles down as a reasonably stable U-236 nucleus.

Most U-235 nuclei do not succeed in reaching stability. Instead, the violent pulsations become more violent, and abruptly the nucleus explodes, breaks in two. For an infinitesimal instant, the raw interior of an atomic nucleus is exposed

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to interatomic space. The frightful concentration of raw, unstable energies inside radiates tremendous and violent gamma radiation. The exposed parts of the nucleus allow the terrific electric repulsions to take effect, and the two parts of the nucleus explode away from each other with colossal violence—and the momentarily broken surface film of the nucleus snaps shut again across the wound—but now there are two nuclei exploding outward.

Neither of the two newly created nuclei is stable. Each has too much mass in proportion to the positive charge of the nucleus—too many neutrons in proportion to its protons. As the new nuclei drive away, they are spitting electrons violently, getting rid of their still-excessive energies in high-speed electron emission, and by throwing out gamma radiation simultaneously. At the same time, one of them may balance up by discharging a neutron—perhaps two, or even three. The other may, by chance, balance itself by discharging nothing but electrons, one after another until seven or eight have been fired out. On the statistical average, however, slightly more than two neutrons are discharged for each fission.

The discharged nuclei, and the discharged gamma radiation, don't see steel and diamond and mercury as we do. To them, each material is a vague cloud of electrons, with rocks in 'em. The electrons do not count to such particles—only the nuclei are of importance. The result is the strange fact that, to the atomic bomb, diamonds are softer than steel, and steel softer than liquid mercury. Mercury nuclei are very massive, very hard to knock out of the way; iron atoms are lighter, and more readily shoved aside, while the light carbon atoms of diamond are like weeds to a bulldozer. Furthermore, the high density of mercury means that more atomic mass per cubic centimeter is going to be in the way, making mercury hard stuff to penetrate.

But obviously, no material whatsoever, now or forever in the future, can stop the force of an atomic blast. The only thing that can stop atomic particles is pure force—the terrific force-fields of a nucleus can, and do. But no wall of nuclei can exist; they cannot be brought into contact both because of the enormous electrical repulsions, and because the nuclei would, like drops of water, "wet" each other, and flow into one supercolossal, hyperexplosive atom.

No material whatsoever, now or in the future, can stop atomic radiation—gamma rays—either, for the same reason. Lead is *not* opaque to gamma radiation, nor is any other material, for the simple reason that gamma ray quanta are of the same order of size and energy as atomic particles. They, like particles, see the ordinary atom as a vague cloud of ghostly electrons surrounding very rare, very tiny nuclei. Gamma rays shine through such a cloud just as light shines through ordinary cumu-

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International News Photo

Test Baker at Bikini. The perfect geometrical form of the burst results as a visible plot of all points distant from the point of burst by the speed of shock wave times the elapsed time since the burst. The white ring in the lagoon is the water shock wave—it sank the ships. The white dome is condensed moisture behind the air shock wave, a Titanic Wilson Cloud Chamber effect.

lus clouds; a thick enough layer of clouds will so obscure the sun as to make a day almost as dark as night, and similarly a thick, leaden cloud of atoms will absorb nearly all the gamma radiation.

The strength of any ordinary material lies in the intermolecular bonds; the bonds of chemical molecules depend on the interaction of the outermost electrons of the elements involved. Since an atomic particle finds those electrons mere ghosts, practically nonexistent, the energy represented by any ordinary chemical bond is effectively zero. That is, if an atomic bomb were to go off in the midst of 100 tons of TNT, the fact that the carbon, hydrogen, oxygen and nitrogen atoms were linked as TNT molecules, rather than being air, water and coal, would make no detectable difference. In either case, all the atoms would be so blasted that all would be converted to incandescent gas. The previous chemical arrangement of the molecules would be as meaningless as the question of whether or not a mousetap

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had been cocked and ready to snap before a 16-inch naval shell hit it. In turn, the question of whether or not the 16-inch shell hit it would be meaningless if an atomic bomb went off; both the shell and the mousetrap would be reduced to incandescent ions.

Some of the reports that have come out of Bikini indicate that 18-inch steel armor stopped ten percent of the gamma radiation of the bomb. Inverting this interesting statistic to its more natural form makes it more meaningful; ninety percent walked right on through. If ninety percent of the incident shells came through, it wouldn't be termed armor.

Actually, inadequate armor against gamma rays can be more dangerous than none at all. The United States Navy has long practiced a philosophy of all-or-nothing in armoring against shells. That is, a battleship carries 16-inch thick armor plate, over vital parts, and no armor at all over other parts. The reason is simple; 8-inch armor plate, if struck by a 16-inch shell, simply disintegrates into great, jagged, 8-inch chunks of shrapnel. Light plate of mild steel is better; a shell will puncture that, maybe tear it up like a crumpled tin can, but won't make shrapnel of it.

With high-energy gamma radiation, a quite similar phenomenon appears. At the General Electric laboratories in Schenectady, they have a gadget called a betatron—which had been discussed in these pages some years ago, and has been used in stories. At G.E., it is performing remarkable, and important research, as a super-power X-ray generator, providing 100,000,000 volt X rays. In the early testing with this instrument, Dr. E. E. Charlton, in charge of the X-ray work at G.E., made a highly interesting little experiment.

A piece of X-ray film was placed before the betatron, and half the plate shielded behind inch-thick blocks of solid lead, the other half exposed directly—save for the light-tight wrappings—to the beam of X rays. The exposures made, and the plate developed, the researchers found, as expected, that half the plate was blackened completely, the other half practically untouched. Also, as they expected—and you may not have!—the *blackened* half was behind the lead shield, the *clear* section was the part *directly exposed to the beam.*

The reason for this strange reversal of things?

Simple. Lead isn't opaque to X rays—or gamma rays as they are called when manufactured by radioactive atoms—but merely a dense cloud. With 100,000,000 volt rays—or any really high voltage rays—the energy of the radiation quantum is so high that it tends to smash its way through atoms without causing much ionization, without, in other words, giving up much energy. The original rays smashed through the exposed film so easily that they didn't even give up energy enough to cause blacken-

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ing. Like a high-velocity bullet smashing through a glass window, they made a neat, small hole that didn't crack the sensitive surface.

But the lead was dense enough to offer serious opposition to even such high-intensity rays as those from the betatron. The 100,000,000 volt rays, passing near lead nuclei, would be trapped by the strange pair-formation phenomenon; the energy of the radiation would be suddenly converted to an electron-positron pair, the two charged particles smashing off with kinetic energy equal to the radiation energy minus the 1,000,000 volts needed to create an electron and a positron. The pair would smash their way through the lead, and because they are light, charged particles, would cause a terrific stir and confusion among the lead electrons—and that stir and confusion is precisely what creates X rays.

In essence, the lead acts as a sort of transformer: 100,000,000 volt rays go in, and are stepped down to perhaps 1,000,000 volt rays. But energy balances are at work; there will be 100 times as much 1,000,000 volt X ray for each 100,000,000 volt ray! Naturally the photographic plate behind the lead "shield" is blasted completely black by that terrific gout of secondary radiation.

Inadequate shielding—because it gives off floods of secondary radiation—is worse than none at all!

"Adequate," incidentally, can be defined, in the case of gamma rays from atomic bombs as three feet of solid lead. Two feet of gold, platinum, or osmium would do, too. They make fine ray stoppers, since they're even denser than lead. Unfortunately they are a bit more costly.

Of course, while that lead shielding would stop the gamma rays, it wouldn't be there at all if the bomb went off very close; it would simply vanish as stripped nuclei and free electrons in the 100,000,000° heat of the atomic bomb. And if the blast wave hit the lead, it would be crushed back on the "protected" personnel. Furthermore, you will notice that the Evaluation Commission reports that the equivalent of several hundred tons of radium was created in the water of the lagoon by the underwater test. How long you could stay behind your safe, three-foot lead shield would determine whether or not you could outlast the radioactivity of the debris.

Actually, there are two important kinds of radioactivity; one is the radioactivity of the fission product nuclei, and of the water and salts of the ocean, caused by direct contact with the bomb. The second and even more inescapable type is the radioactivity generated in the steel of the ships themselves by the enormously high-energy gamma rays, and by the neutrons escaping from the uranium fission reaction. Ordinary light can, when it strikes a metallic surfece, blast loose an electron—the familiar

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The submarine Skate *appeared an utter wreck after Test Able, but this close-up reveals interesting contrast. The tangled scrap that is so evident was mere outer shell; notice that the massive fittings of the pressure hull are undistorted. The bomb's pressure wave reached 500 pounds per square inch—a "normal" pressure for a deep-diving submarine.*

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photoelectric effect on which television tubes are based, and the electric eyes of commerce. But gamma rays, because of their enormously higher energy, can actually blast nuclear particles out of the nucleus, by a similar photoelectric —or gamma-electric—effect. Thus iron atoms struck by extremely high-intensity gamma rays can become radioactive. Many types of atoms undergo such changes. Since the rays from the bomb are of extremely high energy, and in immense quantity, large-scale radioactivation of material exposed to the radiation can result.

There would be some hope of flushing off radioactive salts from the decks of ships deluged with radioactive water if clean water were available—but you can't flush off radioactive atoms actually buried in the structure of the ship.

Also, at Bikini, the Navy tried some bewildering—if not bewildered!—methods of reducing radioactivation of ships. The destroyer *Hughes* was deluged with foamite fire extinguisher compound. The exact idea behind this move is not clear. Presumably it was realized by the officer in charge of the trial that radioactivity is not a fire that can be quenched, and that foamite doesn't have density enough to seriously interfere with escaping radiation. Also, since foamite is specifically designed to stick and cling to surfaces, thus holding itself on, and smothering ordinary fires—it is made up of rather gooey, adhesive components —it could be expected to retain radioactive salts in place, rather than washing them away.

One psychological point of considerable interest is worth adding. When Admiral Blandy first reported the Baker Day test results —a report made a few hours after the test, before the *Saratoga's* triple-walled hull had gone down —he stated that three ships had been sunk, the *Arkansas,* a concrete oil barge, and an LST. The interesting point is that no mention was made of the LSM 60, the 200-foot craft from which the atomic bomb was suspended. It was so completely and generally understood that nothing actually near the bomb had the faintest chance of survival that the admiral did not think to mention that the LSM 60 had ceased to exist.

But suppose the bomb had been suspended beneath the *Saratoga?* The 42,000 ton *Sara,* for all her triple-hulled construction, and immense weight, would have been disintegrated as completely as the little LSM 60—and it's rather fascinating to consider what monstrous shrapnel a 42,000 ton ship would constitute as it dropped back in fragments from the mile-high peak of the water column.

What, for instance, would have happened to the *New York* if one of the *Sara's* giant turbine rotors dropped on her deck from five thousand feet up?

In any case, it's interesting to see what a single bomb, a quarter mile from the nearest ship, can do to a naval fleet. One battleship sank so swiftly there seems to be

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no certainty of just how long it did take, a triple-hulled super-carrier gone in a few hours, and another modern battleship hull in a few days.

The accompanying photographs give a rather good feeling, I think, of the stark futility of attempting to make any hull immune, or even markedly resistant, to the atomic bomb. The Navy's toys floating on the ruffled surface of the sea, tossed as carelessly as model boats by the atomic giant.

As we have said before, the only defense against atomic bombs is to be where the bombs aren't. The President's Evaluation Commission puts the same thought in more official language—distance is the only defense.

Admiral Blandy has commented that this atomic attack is not merely a mechanical attack on the ships, but a sort of poison warfare against the crews. To date, the atomic bomb has never been allowed to exert its full mechanical power, since neither the airburst, nor the shallow underwater burst, gave the bomb sufficient resistance to work against. Damage to structures must be mechanical, since they are insensitive to gamma radiation, and it is enormously more difficult—in terms of energy—to fuse a steel beam than to twist it into a pretzel. The original Hiroshima and Nagasaki bombs were air-burst bombs, because air-burst was the most effective way to damage lightly built structures, and attack a city.

For effective damage against heavily built structures, such as ships, some medium less adapted to cushioning shocks than a pneumatic pillow—the atmosphere—would be desirable. The shallow-water burst simply pushed a few million tons of water out of its way—ten million, according to the report—and thus expended most of its mechanical energy in the air.

The following material is the official preliminary evaluation report:

Preliminary Report Following the Second Atomic Bomb Test

Report by the Joint Chiefs of Staff Evaluation Board for the Atomic Bomb Tests

30 July 1946

In compliance with your directive of 27 February 1946, the Evaluation Board presents a second preliminary report of the atomic bomb tests held at Bikini Atoll.

Section I

Supplement to Preliminary Report on Test "A"

In general, the observations on ship damage presented by this board in its first report were confirmed by engineering surveys.

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The location of the bomb burst, accurately determined from photographs, was such that only one ship was within 1,000 feet of the surface point over which the bomb exploded. There were about 20 ships within half a mile, all of which were badly damaged, many being put out of action and five sunk. It required up to 12 days to repair all of those ships left afloat sufficiently so that they could have steamed under their own power to a major base for repair.

It is now possible to make some estimate of the radiological injuries which crews would have suffered had they been aboard Test "A" target vessels. Measurements of radiation intensity and a study of animals exposed in ships show that the initial flash of principal lethal radiations, which are gamma rays and neutrons, would have killed almost all personnel normally stationed aboard the ships centered around the air burst and many others at greater distances. Personnel protected by steel, water, or other dense materials would have been relatively safe in the outlying target vessels. The effects of radiation exposure would not have incapacitated all victims immediately, even some of the most severely affected might have remained at their stations several hours. Thus it is possible that initial efforts at damage control might have kept ships operating, but it is clear that vessels within a mile of an atomic bomb air burst would eventually become inoperative due to crew casualties.

Section II

Observations on Test "B"

The Board divided into two groups for the observation of Test "B." Four members, after surveying the target array from the air, witnessed the explosion from an airplane eight miles away at an altitude of 7500 feet. The other three members inspected the target array from a small boat the day before the test and observed the bomb's explosion from the deck of the *USS Haven*, 11 miles at sea to the east of the burst.

The Board reassembled on the *Haven*, on 26 July, and the members have since examined photographs, data on radioactivity, and reports of other phenomena, and have inspected some of the target vessels. They have also consulted with members of the Task Force Technical Staff.

As scheduled, at 0835 Bikini time on 25 July, a bomb was detonated well below the surface of the lagoon. This bomb was suspended from LSM-60, near the center of the target array. The explosion was of predicted violence and is estimated to have been at least as destructive as 20,000 tons of TNT.

To a degree which the Board finds remarkable, the visible phenomena of explosion followed the predictions made by civilian and service phenomenologists attached to Joint Task Force One. At the moment of explosion, a dome, which showed the light of incandescent material within, rose upon the

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surface of the lagoon. The blast was followed by an opaque cloud which rapidly enveloped about half of the target array. The cloud vanished in about two seconds to reveal, as predicted, a column of ascending water. From some of the photographs it appears that this column lifted the 26,000-ton battleship for a brief interval before the vessel plunged to the bottom of the lagoon. Confirmation of this occurrence must await the analysis of high-speed photographs which are not yet available.

The diameter of the column of water was about 2200 feet, and it rose to a height of about 5500 feet. Spray rose to a much greater height. The column contained roughly ten million tons of water. For several minutes after the column reached maximum height, water fell back, forming an expanding cloud of spray which engulfed about half of the target array. Surrounding the base of the column was a wall of foaming water several hundred feet high.

Waves outside the water column, about 1000 feet from the center of explosion, were 80 to 100 feet in height. These waves rapidly diminished in size as they proceeded outward, the highest wave reaching the beach of Bikini Island being seven feet. Waves did not pass over the island, and no material damage occurred there. Measurements of the underwater shock wave are not yet available. There were no seismic phenomena of significant magnitude.

The explosion produced intense radioactivity in the waters of the lagoon. Radioactivity immediately after the burst is estimated to have been the equivalent of many hundred tons of radium. A few minutes exposure to this intense radiation at its peak would, within a brief interval, have incapacitated human beings and have resulted in their death within days or weeks.

Great quantities of radioactive water descended upon the ships from the column or were thrown over them by waves. This highly lethal radioactive water constituted such a hazard that after four days it was still unsafe for inspection parties, operating within a well-established safety margin, to spend any useful length of time at the center of the target area or to board ships anchored there.

As in Test "A," the array of target ships for Test "B" did not represent a normal anchorage but was designed instead to obtain the maximum data from a single explosion. Of the 84 ships and small craft in the array, 40 were anchored within one mile and 20 within about one-half mile. Two major ships were sunk, the battleship *Arkansas* immediately and the heavy-hulled aircraft carrier *Saratoga* after 7½ hours. A landing ship, a landing craft, and an oiler also sank immediately. The destroyer *Hughes,* in sinking condition, and the transport *Falcon,* badly listing, were later beached. The submerged submarine *Apogon* was sent to the bottom emitting air bubbles and fuel oil, and one to three other submerged submarines

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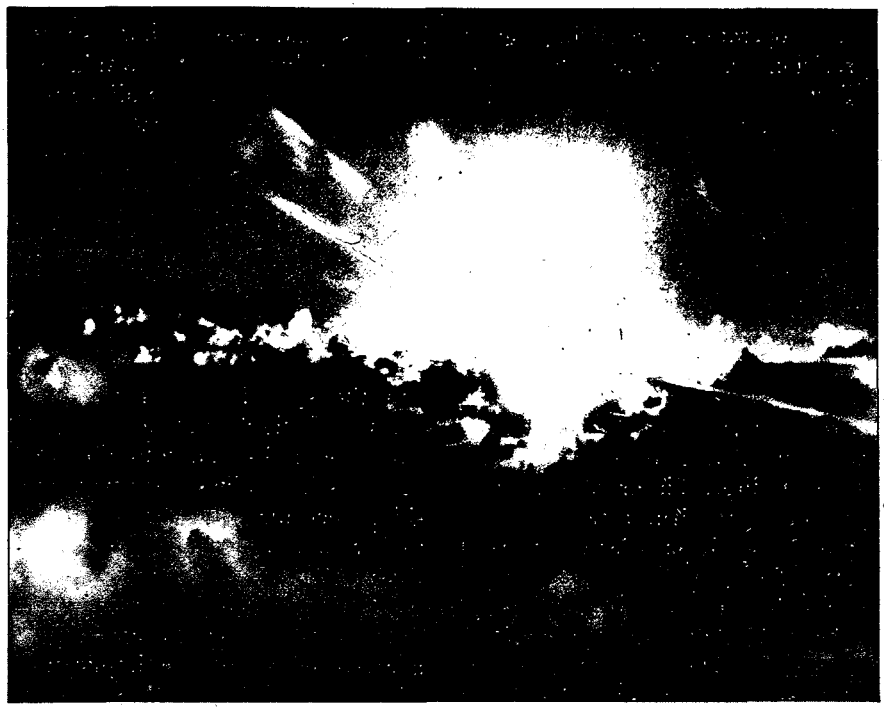

International News Photo

The furious blaze of atomic light blasts through the clouds over Bikini on Able Day.

are believed to have sunk. Five days after the burst, the badly damaged Japanese battleship *Nagato* sank. It was found impossible immediately to assess damage to hulls, power plants and machinery of the target ships because of radioactive contamination. Full appraisal of damage will have to await detailed survey by engineer teams. External observation from a safe distance would indicate that a few additional ships near the target center may have suffered some hull damage. There was no obvious damage to ships more than one-half mile from the burst.

Section III

Observations and Conclusions, Both Tests

The operations of Joint Task Force One in conducting the tests have set a pattern for close, effective co-operation of the Armed Services and civilian scientists in the planning and execution of this highly technical operation. Moreover, the tests have provided valuable training of personnel in

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joint operations requiring great precision and co-ordination of effort.

It is impossible to evaluate an atomic burst in terms of conventional explosives. As to detonation and blast effects, where the largest bomb of the past was effective within a radius of a few hundred feet, the atomic bomb's effectiveness can be measured in thousands of feet. However, the radiological effects have no parallel in conventional weapons. It is necessary that a conventional bomb score a direct hit or a near miss of not more than a few feet to cause significant damage to a battleship. At Bikini the second bomb, bursting under water, sank a battleship, immediately at a distance of well over 500 feet. It damaged an aircraft carrier so that it sank in a few hours, while another battleship sank after five days. The first bomb, bursting in air, did great harm to the superstructures of major ships within a half-mile radius, but did only minor damage to their hulls. No ship within a mile of either burst could have escaped without some damage to itself and serious injury to a large number of its crew.

Although lethal results might have been more or less equivalent, the radiological phenomena accompanying the two bursts were markedly different. In the case of the air-burst bomb, it seems certain that unprotected personnel within one mile would have suffered high casualties by intense neutron and gamma radiation as well as by blast and heat. Those surviving immediate effects would not have been menaced by radioactivity persisting after the burst.

In the case of the underwater explosion, the air-burst wave was far less intense and there was no heat wave of significance. Moreover, because of the absorption of neutrons and gamma rays by water, the lethal quality of the first flash of radiation was not of high order. But the second bomb threw large masses of highly radioactive water onto the decks and into the hulls of vessels. These contaminated ships became radioactive stoves, and would have burned all living things aboard them with invisible and painless but deadly radiation.

It is too soon to attempt an analysis of all of the implications of the Bikini tests. But it is not too soon to point to the necessity for immediate and intensive research into several unique problems posed by the atomic bomb. The poisoning of large volumes of water presents such a problem. Study must be given to procedures for protecting not only ships' crews but also the populations of cities against such radiological effects as were demonstrated in Bikini lagoon.

Observations during the two tests have established the general types and range of effectiveness of air and shallow underwater atomic-bomb bursts on naval vessels, army matériel, including a wide variety of Quartermaster stores, and personnel. From these observations and from instrumental data

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it will now be possible to outline such changes, not only in military and naval design but also in strategy and tactics, as future events may indicate.

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B. DEWEY
T. F. FARRELL
J. H. HOOVER
R. A. OFSTIE
J. W. STILWELL
K. T. COMPTON, *CHAIRMAN*

* * * * *

The second item of interest is reproduced in photostat form, a copy of the original mimeographed price list of the National Atomic works at Clinton. Appearing in the article department today, it would be obvious and very carefully worked out science-fiction only five years ago. Remember Lester del Rey's yarn "Nerves"? This item might have been one of the price lists from such a plant.

Today, it offers isotopes for sale to accredited research institutes and laboratories. A bit of explanation may make it clearer to the non-atomic specialists. The reactions symbolized as (n, γ) aren't perhaps intelligible to a biochemist, or an aerodynamicist.

The six most important types of transmutation reactions involve the principal atomic particles and gamma radiation in various types of exchange reactions. If a neutron enters an atomic nucleus, something usually comes out. The entrance of the neutron adds a huge amount of energy to the nucleus; to balance itself under the new conditions, it may discharge a proton immediately, and undergo further change at a later time. Thus if a nitrogen nucleus of atomic weight 14 absorbs a neutron, it immediately discharges a proton. Since the proton and neutron have about the same weight, the new nucleus also has an atomic weight of 14—but the positive charge of the proton being removed, the new nucleus is one atomic number lower on the scale—carbon. This reaction is symbolized (n, p), meaning simply neutron in, proton out.

The resultant C^{14} is an important unstable isotope; since the only stable atomic nucleus of mass 14 is nitrogen, the C^{14} later reconverts itself to the stable form of N^{14} by discharging an electron from the nucleus. This, of course, puts us back where we started—but in the meantime we have a carbon atom which can be used as a tracer in biochemical reactions. Furthermore, C^{14} is only mildly unstable, and has a half-life greater than 1000 years, so that a sample of C^{14} can be used for generations without noticeable reduction of its potency.

The exact reverse of this type of reaction is the (p, n) reaction, wherein a proton is driven into a nucleus, and a neutron driven out. This reaction is also used to produce a radioactive carbon isotope, but starting with boron. In this, the reaction is $B^{11} + p = C^{11} + n$. The "p" standing for proton can be interpreted as H—a hydrogen nucleus. C^{11} is radioactive, because the B^{11} isotope is the natural, stable

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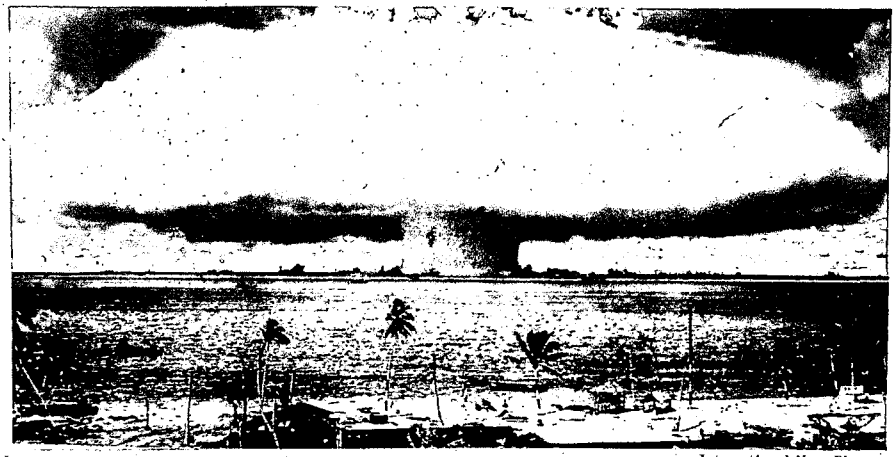

International News Photo

The shape of this Baker Day burst is unsuited to our pages, but close examination will show the* six hundred foot high *wall of foaming water at the base of the column. This deluged ships with radioactivity. The shock wave, not visible in this shot, sank ships.

nucleus of mass 11, and represents the most efficient way of arranging nuclear particles totaling 11 in number. The C^{11} is a very considerably less stable arrangement, and the half-life is only 21 minutes, the change taking place by emission of a positron, thus decreasing the positive charge on the nucleus by one unit. Again, it goes back to boron.

Some of the early artificial radioactivity work involved alpha-particle induced transmutations, symbolized as (α, n) or (α, p) —alpha in-neutron out or alpha in-proton out.

The fourth main type of transmutation reaction involves gamma radiation—that gamma ray photoelectric effect. It is symbolized as (γ, n) and (γ, p).

Deuteron reactions are important because cyclotrons can readily accelerate the deuteron, but have a hard time finding a handle on the uncharged neutron. These deuteron reactions are symbolized (d, n) and (d, p). There are also (n, α), (p, α) and (d, α) reactions of lesser importance.

The simplest of all the reactions of transmutation is the direct capture of a neutron. Since this adds energy to the absorbing nucleus, gamma rays usually emerge, carrying the excess energy. This is symbolized (n, γ), and is one of the most important of all now. The uranium pile is characterized by an atmosphere of neutrons; there are stupendous numbers of free neutrons, of all velocities, inside the pile. Under such circumstances, neutron reactions are the easiest ones, and most of the synthetic isotopes are prepared by the neutron capture reaction.

Frequently a given isotope can be prepared by two different

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transmutations—perhaps an (n, p) reaction with the next element up the scale, or an (n, γ) reaction with a lighter isotope of the desired element. A third possibility might be a (p, γ) with a heavy isotope of the next lighter element. Of these three, the (n, γ) would be the choice now, because (n, γ) reactions go easier than (n, p) reactions, and the atomic pile supplies quantities of neutrons.

The result of these facts is that those synthetics made by (n, γ) reactions are cheaper and more plentiful than those made by the more difficult (n, p) reaction. Specifically, notice the difference in price between C^{14}, the product of an (n, p) reaction on N^{14} and I^{131}, product of an (n, γ) reaction.

However, some (n, p) reactions are easy ones; the difficulty varies from atomic type to type. Another factor that tends to cause confusion and difference in pricing is the quantity of material needed to produce a given number of radioactive disintegrations per second. If an isotope has a half life of 1000 years, it will, obviously, take a very great number of atoms to produce 1000 transmutations per second. If the half life is ten minutes, a relatively small number of atoms will produce 1000 explosions per second.

Since the radioactive material's primary interest is its radioactivity, the isotopes are sold by the millicurie—a unit of radioactivity rather than a unit of weight or volume. Potassium is radioactive naturally, due to the presence of K^{40} to the extent of .012%. But it takes hundreds of pounds of potassium to represent 1 millicurie, because the half life of K^{40} is many billions of years. On the other hand, radon, with a half life of 3.5 days, and 100% radioactive, if handled by the millicurie is an exceedingly minute quantity.

In judging the price of the isotopes, bear in mind that the purchase of some C^{14} is a capital investment; it'll really stay with you! It's good for at least 3000 years, by which time it will be reduced to 12.5% of its original strength, and still perfectly usable. But the Na^{24} listed is a current-expense item; it has a half life of 14.8 hours.

Finally, another important factor in cost is whether the synthetic atoms are made by the most unusual and most interesting of all transmutation reactions, the one that might best be symbolized as an (n, *) reaction—the neutron-and-go-bang reaction of uranium. The fission products of the uranium reaction in the pile can not, of course, be overlooked as they are the greatest—and easiest—source of radioactive isotopes.

In a previous issue we showed the mechanics of making and separating atomic isotopes by inserting material into the pile; the separation of fission products from the uranium reacting in the pile has not been shown to the public as yet.

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ISOTOPES BRANCH, RESEARCH DIVISION, MANHATTAN DISTRICT

P. O. Box E, OAK RIDGE, TENN.

RADIOISOTOPES

available from

Clinton Laboratories, Monsanto Chemical Co.,
P. O. Box 1991, Knoxville, Tenn.

PRICE LIST

as approved 28 June 1946 by

The District Engineer, Manhattan District, Oak Ridge, Tenn.

(Prices subject to change)

Table numbers in this list and *Science* article (14 June) are the same.

How to estimate cost:

1.	No. of units * desired _____	
2.	Price per unit _____	
3.	Total (1 × 2)	_____
4.	For each request add the following handling and administrative charge	$ 25.00
5.	Cost of material (3 + 4)	$_____
6.	Deposit on shipping container **	_____
7.	Total amount of remittance (5 + 6)	$_____

All transportation costs including return of container will be paid by requester.

* The units (as shown in the headings of each table) are: 1 microcurie
1 millicurie
or 1 sample (irradiation unit)

The curie is defined for purposes of this list as 3.7×10^{10} disintegrations/sec. occurring in the active element. All methods by which a given isotope disintegrates are included.

** A deposit will be required on returnable shipping containers used for transportation of gamma ray emitters. A demurrage charge may be made for containers retained longer than the period provided for in the "Agreement and Conditions for Order and Receipt of Radioactive Materials."

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TABLE 1

Fission Products

Group	Radioisotope	Unit Price (Per Millicurie)	Unit Price (Per Microcurie)
I	(Zr 95)* (Cb 95)	$ .67	
II	Y 91	1.15	
III	(Ce 141)* (Ce 144)	1.35	
IV	Ba 140	1.35	
V	(Sr 89)* (Sr 90)	1.35	
VI	(Pr 143) (Nd 147) (61 147)* (Eu 156) (Eu 155)	12.51	
VII	Cs 137	134.70	
VIII	(Ru 103) (Ru 106) (Te 127)* (Te 129)	6.74	

TABLE 2

Fission Products

(Derived from Table 1)

I	Cb 95	23.09	
II	(Ru 103)* (Ru 106)	23.09	
VIII	(Te 127)* (Te 129)	23.09	
VI	Pr 143	72.16	
VI	Nd 147	72.16	
VI	61 147		$ 14.43

* Mixtures.

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TABLE 3

See Price Lists of Other Tables

TABLE 4

Radioactive Isotopes producible in pile by (n, γ) reactions.

Prices listed are for chemically unprocessed irradiation units. An irradiation unit is one metal can in one of 3 sizes (5 cc, 10 cc or 40 cc) dependent upon quantity of target material required per sample.

Isotope	Estimated Quantity which may be in sample**	Cost per Irradiation Unit (1 can)
Na 24	100 Millicuries	$ 7.36
P 32	500 "	21.65
S 35***	10 "	13.13
Cl 36	10 Microcuries	84.84
K 42)	250 Millicuries	8.89
Ca 41)*	100 ")	38.51
Ca 45)	5 ")	
Sc 46	1 "	9.73
Ti 51	1 "	29.33
Cr 51	100 "	13.42
Fe 55)*	(500 Microcuries)	
Fe 59)	(1 Millicurie)	21.30
Co 60	100 Millicuries	31.03
Ni 59	10 Microcuries	9.73
Cu 64	100 Millicuries	7.36
Zn 65)*	(100 ")	
Zn 69)	(300 ")	20.47
Ga 72	100 "	23.38
Ge 71)*	(10 ")	
Ge 77)	(1 ")	39.03
As 76	100 "	7.36
Se 75	100 "	96.76
Br 82	100 "	7.51
Rb 86	100 "	20.73
Mo 99	100 "	11.08
Ru 103	10 "	25.32
Ag 108, 110	100 "	121.30
Cd 115 (2.8d) (See Footnote 1)	20 " Short bombardment	26.93
Cd 115 (43d) (See Footnote 2)	1 " Long bombardment	91.65

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TABLE 4 (Continued)

Isotope	Estimated Quantity which may be in sample**		Cost per Irradiation Unit (1 can)
In 114	10	"	$ 29.73
Sn 113	1	"	10.25
Sb 122 (See Footnote 3)	100	Millicuries Short Bombardment	7.36
Sb 124 (See Footnote 4)	8	" Long Bombardment	10.07
Te 127)*			
Te 129) (See Footnote 5)	10	"	44.05
Cs 134	100	"	19.75
Ba 131	10	"	16.19
Ia 140	100	"	7.36
Ce 141)*	(100	")	11.26
Ce 143)	(25	)	
Pr 142	100	"	7.36
Eu 154	100	"	84.35
Ta 182	100	"	10.77
W 185	100	"	28.46
Os 191)*	(44	")	29.13
Os 193)	(100	")	
Ir 192, 194	100	"	39.69
Au 198	100	"	7.36
Hg 197 (See Footnote 6)	70	" Short bombardment	32.04
Hg 203, 205 (See Footnote 7)	100	" Long bombardment	100.17
Tl 206	10	"	13.97
Bi 210	10	"	7.36

Footnotes:

1. Will include about 0.25 mc of 43d Cd 115
2. Will include about 20 mc of 2.8d Cd 115
3. Will include about 2 mc Sb 124
4. Will include 100 mc Sb 122
5. Will include Te 131 (30 hr) and I 131 (8 day)
6. Will include about 25 mc of Hg 203, 205
7. Will include about 70 mc of Hg 197

* Mixtures.

** Unit quantity may have been revised from published table.

*** This irradiation unit will also contain approximately 2.5 mc of carrier free P 32 from transmutation.

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TABLE 5

Radioactive Isotopes from Transmutation Reactions.

	SEPARATED		UNSEPARATED	
	UNIT PRICE			
Isotope	*Per Millicurie*	*Per Microcurie*	*Estimated Quantity Which may be in Sample*	*Price Per Irradiation Unit (1 can)*
C 14	$ 367.00			
P 32	1.09		500 Millicuries	$ 255.85 *
S 35	36.56		6 "	26.93
Ca 45		$4.01		

* This unit is a special large can containing approximately 5 lbs. of S.

TABLE 6

Radioactive Isotopes from (n, γ)-produced chains

	SEPARATED	UNSEPARATED	
Isotope	*Unit Price Per Millicurie*	*Estimated Quantity Which may be in Sample*	*Price Per Irradiation Unit (1 can)*
As 77		0.7 Millicuries	$ 34.44
Rh 105		10 "	21.39
Ag 111		10 "	10.97
I 131	$ 1.69	80 "	44.02
Cs 131		10 "	16.02
Pr 143		10 "	11.26
Au 199		10 "	7.36

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For proper interpretation of the price list, the half lives of the isotopes listed are naturally of interest. The best figures available are those published in 1941, but they are probably fairly good on all but the longest lived radioisotopes. (The two long-lived isotopes, C^{14} and Cl^{36} are listed, respectively, as "greater than 1000 years" and "much greater than 1000 years.")

Isotope	*Half Life*	*Price per Millicurie*
C 14	1000 yrs.	$ 367.00
Na 24	14.8 hrs.	0.0736
P 32	14.3 days	1.09
S 35	88 days	36.56
Cl 36	1000 yrs.	8484.00
K 42	12.4 hrs.	0.002
Ca 41	No Listing	0.038
Ca 45	180 days	4010.00
Sc 46	85 days	9.73
Ti 51	72 days	29.33
Cr 51	26.5 days	0.13
Fe 55	4 yrs.	42.60
Fe 59	47 days	21.30
Co 60	5.3 yrs.	31.03
Ni 59	36 hrs.	973.00
Cu 64	12.8 hrs.	0.073
Zn 65	250 days	0.20
Zn 69	13.8 hrs.	0.07
Ga 72	14 hrs.	0.23
Ge 71	11 days	3.90
Ge 77	12 hrs.	39.03
As 76	26.8 hrs.	0.0736
As 77	No Listing	49.00
Se 75	48 days	9.67
Br 82	No Listing	7.51
Rb 86	19.5 days	2.07
Mo 99	67 hrs.	1.10
Ru 103	4 hrs.	2.50
Rh 105	46 days	2.13
Ag 108, 110	2.3 min. 22 secs.	1.21
Ag 111	7.5 days	1.09
Cd 115	2.8 day isomer	1.35
Cd 115	43 day isomer	91.65
In 114	48 days	1.03

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Isotope	*Half Life*	*Price per Millicurie*
Sn 113	90 days	10.25
Sb 122	2.8 days	0.07
Sb 124	60 days	1.26
Te 127	9.3 hrs.	Not listed separately
Te 129	72 mins.	4.40
Te 131	30 hrs.	Not listed separately
I 131	8.0 days	1.69
Cs 131	No Listing	1.60
Cs 134	1.7 years	1.97
Ba 131	No Listing	1.62
Ba 140	No Listing	1.35
La 140	31 hrs.	0.74
Ce 141	No Listing	0.11
Ce 143	No Listing	0.44
Pr 142	18.7 hrs.	0.073
Pr 143	No Listing	1.26
Eu 154	No Listing	0.84
Ta 182	97 days	0.11
W 185	77 days	0.28
Os 191	No Listing	0.60
Os 193	40 hrs.	0.29
Ir 192	60 days	0.39
Ir 194	19 hrs.	Lists with Ir 192
Au 198	2.7 days	0.07
Au 199	3.3 days	0.73
Hg 197	25 hrs.	0.44
Hg 203	54 days	1.00
Hg 205	No Listing	Lists with Hg 203
Tl 206	3.5 yrs.	1.40
Bi 210	5 days	0.73

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In addition, element 61, which has *no* natural, stable isotope, is available in the form of 61^{147}. The only listing of element 61 in pre-war tables is simply "Elem. 61?", indicating that a synthetic 61 had been prepared by cyclotron bombardment, but which isotope of 61 it was not certain. It had a half life of 12.5 hours.

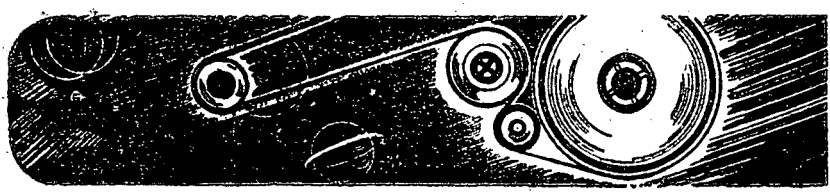
In this respect, 61^{147} resembles Pu^{239}—it, too, is a synthetic atom, a man-made isotope of an element that cannot exist in nature because it has *no* stable form. That an element near the middle of the table—as 61^{147} is—should have no stable isotope seems remarkable, but the 61^{147} listed in the price schedule is a fission product. If the uranium fission reaction, which produces all possible isotopes of all possible elements near the middle of the table, does not produce any stable isotope of element 61—there ain't no sich animile.

The statement "No Listing" under "Half Life" means that the pre-war tables did not list any isotope of the particular type under consideration. For instance, Ba^{130} is listed in pre-war tables; it's a stable, natural isotope. No Ba^{131} is listed, so its half life isn't immediately available. The heaviest listed isotope of Barium is Ba^{139}—an 86 minute radioisotope, which discharges a 1,000,000 volt electron, and a 600,000 volt gamma ray. But no Ba^{140} is listed.

The reason is fairly understandable. Working with cyclotrons, elements can be manufactured only by the few reactions listed earlier. The heaviest stable barium isotope is 138; you'd have to add two successive neutrons to *the same atom* to bring it up to 140—obviously an inordinately improbable trick. Cerium has a stable isotope Ce^{140}—but you'd have to induce two successive positrons to leave it to produce Ba^{140}, or knock two successive protons out of the stable Ce^{142}.

Starting with stable isotopes, there was no way to produce Ba^{140}—except by starting with the semi-stable isotope U^{235}, and neutron bombardment.

THE END.



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TIME ENOUGH

BY LEWIS PADGETT

The Old 'Uns lived in secret—not quite immortal, but for five hundred years or more they'd lived. But nevertheless they'd all died at about one century!

Sam Dyson found the secret of immortality five hundred years after the Blowup. Since research along such lines was strictly forbidden, he felt a panicky shock when the man from Administration walked into his office and almost casually told Dyson that immortality was nothing new.

"This is top secret," the Administrator said, slapping a parcel of manifold sheets on Dyson's desk. "Not these papers, of course, —but what I'm telling you and what you're going to see. We hardly ever let anybody in on the secret. In your case we're making an exception, because you're probably the only guy who can correlate the necessary field work and know what the answers to the questions mean. There are plenty of intangibles in your work, and that's why you've got to handle it personally."

Dyson's current assignment, which had originally interested him in the problem of immortality, dealt with artificial intellectual mutation. He sat back, trying not to show any particular emotion, and blinked at the Administrator.

"I thought the Archives—"

"The Archives are a legend, fostered by propaganda. There ain't no Archives. A few scattered artifacts, that's all. Hardly anything

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survived the Blowup except the human race."

And yet the government-controlled Archives were supposed to be the source of all modern knowledge!

"This is all secret, Dyson. You won't talk. Sometimes we have to use mnemonic-erasure on blabbermouths, but blabbermouths aren't often let in on such private affairs. You know how to keep your mouth shut. The truth is, we get our scraps of pre-Blowup science from human brains—certain people who were alive when the radiations began to run wild. We keep the Old 'Uns segregated; it'd be dangerous if the world knew immortals existed. There'd be a lot of dissatisfaction."

Sweat chilled Dyson's flanks. He said, "Of course I've heard the rumors of immortals—"

"All sorts of legends came out of the Blowup and the Lost Years. We've issued counterpropaganda to neutralize the original legend. A straight denial would have had no effect at all. We started a whispering campaign that sure, there were immortals, but they lived only a few hundred years, and they were such screwy mutants they were all insane. That part of the public that believes rumors won't envy the immortals. As for legends, ever heard of the Invisible Snake that was supposed to punish carnal sin? It wasn't till after we rediscovered the microscope that we identified the Snake with the spirochete. You'll often find truth in myths, but sometimes it isn't wise to reveal the truth."

Dyson wondered if Administration could possibly have found out about his forbidden research. He hadn't *known* there were immortals; he'd investigated the legends, and his own work in controlled radiation and mental mutation had pointed the way.

The Administrator talked some more. Then he advised Dyson to televise his uncle, Roger Peaslee. "Peaslee's been to a Home and seen the Old 'Uns. Don't look surprised; of course he was sworn to silence. But he'll talk about it to you now; he knows you're going to the—Archives!"

But Dyson felt uneasy until his visitor had left. Then he called his uncle, who held a high post with Radioactives, and asked questions.

"It'll surprise you, I think," Peaslee said, with a sympathetic grin. "You may need psych conditioning when you get back, too. It's rather depressing. Still, until we get time travel, there's no other way of reaching back to Blowup days."

"I never knew—"

"Naturally. Well, you'll see what a Home's like. There'll be an interpreter assigned to give you the dope. And, as a matter of fact, it's good conditioning. You're going to Cozy Nook, aren't you?"

"I think . . . yes, that's it. There are several?"

Peaslee nodded.

"You may run into some of your ancestors there. I know one of your great-greats is in Cozy Nook. It's a funny feeling, to look at and talk to somebody who five hundred

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years ago was responsible for your birth. But you mustn't let her know who you are."

"Why not?"

"It's a special set-up. The interpreter will give you the angles. All sorts of precautions have to be taken. There's a corps of psychologists who work on nothing but the Homes. You'll find out. And I'm busy, Sam. See you when you get back. I hear you're getting married."

"That's right," Dyson said. "We're both government certified, too." His smile was slightly crooked.

"Rebel," Peaslee said, and broke the circuit. The image slowly faded, leaving only a play of pastel colors driving softly across the screen's surface. Dyson sat back and considered.

Presumably neo-radar had not discovered his hidden laboratory, or there would have been trouble. Not serious trouble, in this paternalistic administration. Discussions, the semantics of logicians, and, in the end, Dyson knew that he would be argued around to the other side. They could twist logic damnably. And, very likely, they were right. If research in certain radio-genetic fields had been forbidden, the reasons for that step would hold even heavy water.

Immortality.

Within limits, of course. There were principles of half-life—of entropy—nothing lasts forever. But there were different yardsticks. It would be immortality by normal standards.

So, it had been achieved once before, quite by accident. That particular accident had left the planet in insane chaos for hundreds of years, providing a peculiarly unstable foundation for the new culture that had arisen since. It was rather like a building constructed, without plans, from the alloys and masonry of an earlier one. There were gaps and missing peristyles.

Dyson thumbed through the manifold sheets on his desk. They contained guides, problems in his current research—not the secret research in the hidden laboratory, but the government-approved work on intellectual mutation. To a layman some of the terms wouldn't have meant anything, but Dyson was a capable technician. *Item 24: Check psychopathology of genius-types in pre-Blowup era, continuing line of investigation toward current times. . . .*

He left a transference call for the interpreter, pulled on a cloak, and took a glider to Marta Hallam's apartment. She was drinking maté on the terrace, a small, fragile, attractive girl who efficiently put a silver tube in another maté gourd as soon as she had kissed Dyson. He sat beside her and rubbed his forehead with thumb and forefinger.

"We'll furlough in a few weeks," Marta said. "You work too hard. I'll see that you don't."

He looked at her and saw her against a misty background of a

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thousand years in the future—older, of course, but superficial attractiveness wasn't imported. He'd grow older, too. But neither of them would die. And the treatment did not cause sterility. Overcrowding of the planet could be handled by migration to other worlds; the old rocket fuels had already been rediscovered. Through research in a Home, perhaps, Dyson guessed.

Marta said, "What are you so glum about? Do you want to marry somebody else?"

There was only one way to answer that. After a brief while, Dyson grumbled that he hated to be certified like a bottle of milk.

"You'll be glad of it after we have children," Marta said. "If our genes had been haywire, we might have had a string of freaks."

"I know. I just don't like—"

"Look," she said, staring at him. "At worst, we'd have been treated, to compensate for negative RH or anything like that. Or our kids would have had to be put in an incubation clinic. A year or two of separation from them at most. And worth it, when you figure that they'd have come out healthy specimens."

Dyson said cryptically, "Things would have been a lot easier if we'd never had the Blowup."

"Things would have been a lot easier if we'd stayed unicellular blobs," Marta amplified. "You can't eat your cake and keep the soda bicarb on the shelf."

"A philosopher, eh? Never mind. I've got something up my sleeve—"

But he didn't finish that, and stayed where he was for a while, drinking maté and noticing how lovely Marta's profile was against the skyline and the immense, darkening blue above. After a while the interpreter announced himself, having got Dyson's transference notice, and the two men went out together into the chilly night.

Five hundred years before, an atom was split and the balance of power blew up. Prior to that time, a number of people had been playing tug of war with a number of ropes. Nuclear fission, in effect, handed those people knives. They learned how to cut the ropes, and, too late, discovered that the little game had been played on the summit of a crag whose precipitous sides dropped away to abysmal depths beneath.

The knife was a key as well. It opened fantastic new doors. Thus the Blowup. Had the Blowup been due only to the atomic blast, man might have rebuilt more easily, granting that the planet remained habitable. However, one of the doors the key opened led into a curious, perilous place where physical laws were unstable. Truth is a variable. But no one knew how to vary it until after unlimited atomic power had been thrown on the market.

Within limits, anything could happen, and plenty of things did. Call it a war. Call it chaos. Call

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it the Blowup. Call it a shifting of a kaleidoscope in which the patterns rearranged themselves constantly. In the end, the *status quo* re-established itself. Man chewed rat bones, but he was an intelligent animal. When the ground became solid under his feet again, he began to rebuild.

Not easily. Hundreds of years had passed. And *very little of the earlier culture had survived.*

When you consider how much of human knowledge is due to pyramiding, that's easier to understand. Penicillin was discovered because somebody invented a microscope because somebody learned how to grind lenses because somebody found out how to make glass because somebody could make fire. There were gaps in the chain. An atomic war would have blown up the planet or ravaged it, but the catastrophe would have been quick—or complete—and if the planet survived, there would have been artifacts and records and the memories of mankind. But the Blowup lasted for a long time—time itself was used as a variable once during that homicidal, suicidal, fratricidal struggle—and *there were no records.*

Not many, at least. And they weren't selective. Eventually cities rose again, but there were odd gaps in the science of the new civilization. Some of those holes filled themselves in automatically, and a few useful records were dug up from time to time, but not many, and the only real clue men had to the scientific culture of pre-Blowup days was something that had remained stable through the variable-truth-atomic cataclysm.

The colloid of the human brain.

Eyewitnesses.

The Old 'Uns in the secret, segregated Homes, who had lived for five centuries and longer.

Will Mackenzie, the interpreter, was a thin, rangy, freckled man of forty, with the slow, easy motions one automatically associated with a sturdier, plumper physique. His blue eyes were lazy, his voice was soothing, and when Dyson fumbled at the unaccustomed uniform, his helpful motions were lazily efficient.

"A necktie?" Dyson said. "A which?"

"Necktie," Mackenzie explained. "That's right. Don't ask me why. Some of the Old 'Uns don't bother with it, but they're inclined to be fussy. They get conservative after the first hundred years, you know."

Dyson had submerged that mild uneasiness and was determined to play this role at its face value. Administration might suspect his *sub rosa* research, but, at worst, there would be no punishment. Merely terribly convincing argument. And probably they did not suspect. Anyway, Dyson realized suddenly, there were two sides to an argument, and it was possible that he might convince the logicians—though that had never been done before. His current job was to dig out the information he needed from the Old 'Uns and—that

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ended it. He stared into the enormous closet with its rows of unlikely costumes.

"You mean they go around in those clothes all the time?" he asked Mackenzie.

"Yeah," Mackenzie said. He peeled off his functionally aesthetic garments and donned a duplicate of Dyson's apparel. "You get used to these things. Well, there are a few things I've got to tell you. We've plenty of time. The Old 'Uns go to bed early, so you can't do anything till tomorrow, and probably not much then. They're suspicious at first."

"Then why do I have to wear this now?"

"So you can get used to it. Sit down. Hike up your pants at the knee, like this—see? Now sit."

He pawed at the rough, unfamiliar cloth, settled himself, and picked up a smoke from the table. Mackenzie sat with an accomplished ease Dyson envied, and pressed buttons that resulted in drinks sliding slowly out from an aperture in the wall.

"We're not *in* Cozy Nook yet," the interpreter said. "This is the conditioning and control station. None of the Old 'Uns know what goes on outside. They think there's still a war."

"But—"

Mackenzie said, "You've never been in a Home before. Well, remember that the Old 'Uns are abnormal. A little—" He shrugged. "You'll see. I've got to give you a lecture. O.K. At the time of the Blowup, the radioactivity caused a cycle of mutations. One type was a group of immortals. They won't live forever—"

Dyson had already done his own research on that point. Radium eventually turns to lead. After a long, long time the energy-quotients of the immortals would sink below the level necessary to sustain life. A short time as the life of a solar system goes—a long time measured against the normal human span. A hundred thousand years, perhaps. There was no certain way to ascertain, except the empirical one.

Mackenzie said, "A lot of the Old 'Uns were killed during the Blowup. They're vulnerable to accidents, though they've a tremendously high resistance to disease. It wasn't till after the Blowup, after reconstruction had started, that anybody knew the Old 'Uns were—what they were. There'd been tribal legends—the local shaman had lived forever, you know the typical stuff. We correlated those legends, found a grain of truth in them, and investigated. The Old 'Uns were tested in the labs. I don't know the technical part. But I do know they were exposed to certain radiations, and their body-structures were altered."

Dyson said, "How old do they average?"

"Roughly, five hundred years. During the radioactive days. It isn't hereditary, immortality, and there haven't been any such radioactives since, except in a few delayed-reaction areas." Macken-

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zie had been thrown off his routine speech by the interruption. He took a drink.

He said, "You'll have to see the Old 'Uns before you'll understand the entire picture. We have to keep them segregated here. They have information we need. It's like an unclassified, huge library. The only link we have with pre-Blowup times. And, of course, we have to keep the Old 'Uns happy. That isn't easy. Supersenility—" He took another drink and pushed a button.

Dyson said, "They're human, aren't they?"

"Physically, sure. Ugly as sin, though. Mentally, they've gone off at some queer tangents."

"One of my ancestors is here."

Mackenzie looked at him queerly. "Don't meet her. There's a guy named Fell who was a technician during the Blowup, and a woman named Hobson who was a witness of some of the incidents you're investigating. Maybe you can get enough out of those two. Don't let curiosity get the better of you."

"Why not?" Dyson asked. "I'm interested."

Mackenzie's glass had suddenly emptied.

"It takes special training to be an interpreter here. As for being a caretaker . . . one of the group that keeps the Old 'Uns happy . . . they're hand-picked."

He told Dyson more.

The next morning Mackenzie showed his guest a compact gadget that fitted into the ear. It was a sonor, arranged so that the two men could talk, unheard by others, simply by forming words inaudibly. The natural body-noises provided the volume, and it was efficient, once Dyson had got used to the rhythmic rise and fall of his heartbeat.

"They hate people to use 'Speranto in front of them," Mackenzie said. "Stick to English. If you've got something private to say, use the sonor, or they'll think you're talking about them. Ready?"

"Sure." Dyson readjusted his necktie uncomfortably. He followed the interpreter through a valve, down a ramp, and through another barrier. Filtered, warm sunlight hit him. He was standing at the top of an escalator that flowed smoothly down to the village below—Cozy Nook.

A high wall rimmed the Home. Camouflage nets were spread above, irregularly colored brown and green. Dyson remembered that the Old 'Uns had been told this was still war time. A pattern of winding streets, parks, and houses was below.

Dyson said, "That many? There must be a hundred houses here, Mackenzie."

"Some of 'em are for interpreters, psychologists, nurses and guests. Only forty or fifty Old 'Uns, but they're a handful."

"They seem pretty active," Dyson said, watching figures move about the streets. "I don't see any surface cars."

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"Or air-floaters, either," Mackenzie said. "We depend on sliding ways and pneumo tubes for transportation here. There's not much territory to cover. The idea is to keep the Old 'Uns happy, and a lot of them would want to drive cars if there were any around. Their reactions are too slow. Even with safeties, there'd be accidents. Let's go down. Do you want to see Fell first, or Hobson?"

"Well . . . Fell's the technician? Let's try him."

"Over," Mackenzie nodded, and they went down the escalator. As they descended, Dyson noticed that among the modern houses were some that seemed anachronistic; a wooden cottage, a red-brick monstrosity, an ugly glass-and-concrete structure with distorted planes and bulges. But he was more interested in the inhabitants of the Home.

Trees rose up, blocking their vision, as they descended. They were ejected gently on a paved square, lined with padded benches. A man was standing there, staring at them, and Dyson looked at him curiously.

In his ear a voice said, "He's one of the Old 'Uns." Mackenzie was using the inaudible sonor.

The man was old. Five hundred years old, Dyson thought, and suddenly was staggered by the concept. Five centuries had passed since this man was born, and he would go on without change while time flowed in flux without touching him.

What effect had immortality had upon this man?

For one thing, he had not been granted eternal youth. The half-time basic precluded that. Each year he grew older, but not quite as old as he had grown the preceding year. He was stooped—Dyson was to learn to recognize that particular stigmata of the Old 'Uns—and his body seemed to hang loosely from the rigid crossbars of his clavicle. His head, totally bald, thrust forward, and small eyes squinted inquisitively at Dyson. Nose and ears were grotesquely enlarged. Yet the man was merely old—not monstrous.

He said something Dyson could not understand. The sound held inquiry, and, at random, he said, "How do you do. My name is Dyson—"

"Shut up!" the sonor said urgently in his ear, and Mackenzie moved forward to intercept the old man, who was edging toward the escalator. Gibberish spewed from the interpreter's lips, and answering gibberish came from the Old 'Un. Occasionally Dyson could trace a familiar word, but the conversation made no sense to him.

The old man suddenly turned and scuttled off. Mackenzie shrugged.

"Hope he didn't catch your name. He probably didn't. There's a woman here with the same name—you said you had an ancestor in Cozy Nook, didn't you? We don't like the Old 'Uns to get any real concept of time. It unsettles them. If Mander should tell her—" He

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shook his head. "I guess he won't. Their memories aren't good at all. Let's find Fell."

He guided Dyson along one of the shaded walks. From porches bright eyes stared inquisitively at the pair. They passed workers, easily distinguishable from the Old 'Uns, and once or twice they passed one of the immortals. There could be no difficulty in recognizing them.

"What did Mander want?" Dyson asked.

"He wanted out," Mackenzie said briefly. "He's only a couple of hundred years old. Result of one of the freak radiation areas blowing off two centuries ago."

"Was he speaking English?"

"His form of it. You see—they lack empathy. They forget to notice how their words sound to the listener. They slur and mispronounce and in the end it takes a trained interpreter to understand them. Here's Fell's place." They mounted a porch, touched a sensitive plate, and the door opened. A young man appeared on the threshold.

"Oh, hello," he said, nodding to Mackenzie. "What's up?"

"Research business. How's Fell?"

The male nurse grimaced expressively. "Come in and find out. He's had breakfast, but—"

They went in. Fell was sitting by a fire, a hunched, huddled figure so bent over that only the top of his bald, white head was visible. The nurse retired, and Mackenzie, motioning Dyson to a chair, approached the Old 'Un.

"Professor Fell," he said softly. "Professor Fell. Professor Fell—"

It went on like that for a long time. Dyson's nerves tightened. He stared around the room, noticing the musty, choking atmosphere that not even a precipitron could eliminate. Here was none of the dignity of age. This foul-smelling, crouching old man huddled in his chair—

Fell lifted his head wearily and let it fall again. He spoke. The words were unintelligible.

"Professor Fell," Mackenzie said. "We've come for a talk. Professor—"

The figure roused again. It spoke.

Mackenzie used the sonor. "They understand English—some of 'em, anyway. Fell isn't like Mander. I'll have him talking soon."

But it took a long time, and Dyson had a throbbing headache before a grain of information was elicited from Fell. The Old 'Un had entirely lost the sense of selectivity. Or, rather, he had acquired his own arbitrary one. It was impossible to keep him from straying from the subject. Mackenzie did his best to act as a filter, but it was difficult.

And yet this old man had been alive five hundred years ago.

Dyson thought of a mate tube, pierced with a number of tiny holes at the end to admit the liquid. Fell was such a tube, stretching back into the unrecorded past—and he,

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too, was pierced with a thousand such holes through which the irrelevant came in painful, spasmic gushes. Someone had cooked an egg too long once—the price of wool was monstrous—some unknown politician was crooked—it must be arthritis, or else—that boy, what was his name? Tim, Tom, something like that—he'd been a genius-type, yes, but the poor boy—it isn't as warm now as it used to be—

Who? Don't bother me. I don't remember. I mean I don't want to be bothered. I'll tell you something, that reagent I made once—

It was all very dull; every schoolboy today knew about that reagent. But Mackenzie had to sit and listen to the interminable tale, though he mercifully spared Dyson most of it. Then, gradually, he edged Fell back to the subject.

Oh, the genius boy—he developed migraine. The specific didn't work long. Medicine's got a lot to learn. I remember once—

Dyson made a few notes.

What he most wanted were factors in the physiomental off-norm variations of the genius-types that had been produced at random by the Blowup. Fell had been a technician at that time, and an excellent research man. But all his notes, naturally, had vanished in the aftermath, when painfully rebuilt units of civilization kept tumbling down again, and the man's memory was leaky. Once Dyson made careful notes before he realized that Fell was giving him the formula for a Martini in chemical terminology.

Then Fell got irritable. He hammered weakly on the arm of his chair and demanded an eggnog, and Mackenzie, with a shrug, got up and let the male nurse take over. The interpreter went out into the filtered sunlight with Dyson.

"Any luck?"

"Some," Dyson said, referring to his notes. "It's a very spotty picture, though."

"You've got to allow for exaggerations. It's necessary to double check their memories before you can believe 'em. Luckily, Fell isn't a pathological liar like some of the Old 'Uns. Want to look up the Hobson woman?"

Dyson nodded, and they strolled through the village. Dyson saw eyes watching him suspiciously, but most of the Old 'Uns were engrossed in their own affairs.

"Just what's the angle on your research?" Mackenzie asked. "Or is it confidential?"

"We're trying to increase mental capacity," Dyson explained. "You remember the I. Q. boys born after the Blowup. Or, rather, you've heard stories about them."

"Geniuses. Uh-huh. Some were crazy as bedbugs, weren't they?"

"Specialized. You've heard of Ahmed. He had a genius for military organization, but after he'd conquered, he didn't know how to reconstruct. He ended up very happy, in a private room playing

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with tin soldiers. Trouble is, Mackenzie, there's a natural check-and-balance. You can't increase intelligence artificially without loading the seesaw, at the wrong end. There are all kinds of angles. We want to build up mental capacity without weakening the brain-colloid in other directions. The brainier you are, the less stable you are, usually. You're too apt to get off on one particular hobby and ride it exclusively. I've heard stories about a man named Ferguson, born about three hundred years ago, who was pretty nearly a superman. But he got interested in chess, and pretty soon that was all he cared about."

"The Old 'Uns won't play games, especially competitive ones. But they're certainly not geniuses."

"None of them?"

Mackenzie said, "At the climacteric, their minds freeze into complete inelasticity. You can date them by that. Their coiffures, their clothes, their vocabularies—that's the label. I suppose senility is just the stopping point."

Dyson thought of half-time, and then stopped short as a musical note thrummed through the village. Almost instantly there was a crowd in the street. The Old 'Uns gathered, thronging closely and moving toward the sound. Mackenzie said, "It's a fire."

"You're not fireproofed?"

"Not against arson. Some fool probably decided he was being persecuted or ignored and started a fire to get even. Let's—" He was thrust away from Dyson by the mob. The musty odor became actively unpleasant. Dyson, pressed in on all sides by the grotesque, deformed Old 'Uns, told himself desperately that physical aspects were unimportant. But if only he were more *used* to deformity—

He pushed his way free and felt a hand on his arm. He looked down into the face of Mander, the Old 'Un he had met at the foot of the escalator that had brought him down to Cozy Nook. Mander was grimacing and beckoning furiously. Gibberish, urgent and unintelligible, poured from his lips. He tugged at Dyson's arm.

Dyson looked around for Mackenzie, but the interpreter was gone. He tried vainly to interrupt the Old 'Un; it was impossible. So he let himself be pulled a few yards away, and then stopped.

"Mackenzie," he said slowly. "Where is Mackenzie?"

Mander's face twisted as he strained to understand. Then his bald head bobbed in assent. He pointed, gripped Dyson's arm again, and started off. With some misgivings, Dyson let himself accompany the Old 'Un. Did the man really understand?

It wasn't far to their destination. Dyson didn't really expect Mackenzie to be in the antique wooden house he entered, but by this time he was curious. There was a darkened room, a sickening sweet odor that was patchouli, though Dyson did not identify it, and he was looking at a shapeless huddle in an armchair, a thing that stirred and

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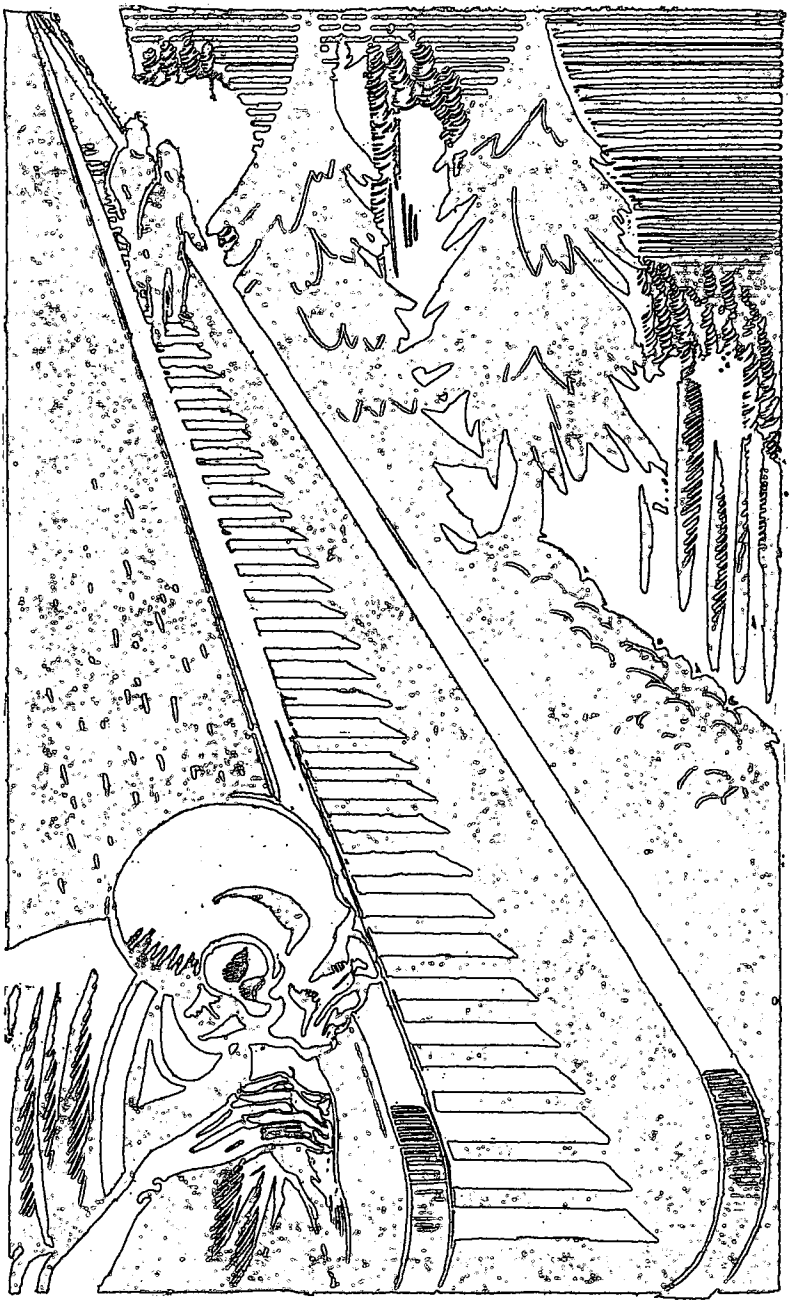

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lifted a face that had all run to fat, white, violet-veined, with sacks of fat hanging loosely and bobbing when the tiny mouth opened and it spoke.

It was very dim in the room. The furniture, replicas of old things made to the Old 'Uns' description, loomed disturbingly. Through the patchouli came other odors, indescribable and entirely out of place in this clean, aseptic, modern age.

"Im'n-s'n," the fat woman said thinly.

Dyson said, "I beg your pardon. I'm looking for Mackenzie—"

Mander clutching painfully at his biceps, a bickering argument broke out between the two Old 'Uns. The woman shrilled Mander down. She beckoned to Dyson, and he came closer. Her mouth moved painfully. She said, with slow effort:

"I'm Jane Dyson. Mander said you were here."

His own ancestor. Dyson stared. It was impossible to trace any resemblance, and certainly there was no feeling of kinship, but it was as though the past had stooped and touched him tangibly. This woman had been alive five hundred years ago, and her flesh was his own. From her had come the seed that became, in time, Sam Dyson.

He couldn't speak, for there was no precedent to guide him. Mander chattered again, and Jane Dyson heaved her huge body forward and wheezed, "They're not fooling me . . . no war . . . I know there's no war! Keeping me locked up here— You get me out of here!"

"But—wait a minute! I'd better get Mackenzie—"

Again Mander squealed. Jane Dyson made feeble motions. She seemed to smile.

"No hurry. I'm your aunt—anyway? We'll have a cup of tea—"

Mander rolled a table forward. The tea service was already laid out, the tea poured in thermocups that kept it at a stable temperature.

"Cup of tea. Talk about it. *Sit—down!*"

All he wanted to do was escape. He had never realized the sheer, sweating embarrassment of meeting an ancestor, especially such a one as this. But he sat down, took a cup, and said, "I'm very busy. I can't stay long. If I could come back later—"

"You can get us out of here. Special exits—we know where, but we can't open them. Funny metal plates on them—"

Emergency exits were no novelty, but why couldn't the locks be activated by the Old 'Uns? Perhaps the locks had been keyed so that they would not respond to the altered physiochemistry of the immortals. Wondering how to escape, Dyson took a gulp of scalding, bitter tea—

Atrophied taste buds made delicacy of taste impossible. Among the Old 'Uns there were no gourmets. Strong curries, chiles—

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Then the drug hit him, and his mind drowned in slow, oily surges of lethargic tides.

Some sort of a hypnotic, of course. Under the surface he could still think, a little, but he was fettered. He was a robot. He was an automaton. He remembered being put in a dark place and hidden until nightfall. Then he remembered being led furtively through the avenues to an exit. His trained hands automatically opened the lock. Those escape doors were only for emergency use, but his will was passive. He went out into the moonlight with Jane Dyson and Mander.

It was unreclaimed country around the Home. The Old 'Uns didn't know that highways were no longer used. They wanted to hit a highway and follow it to a city. They bickered endlessly and led Dyson deeper and deeper into the wilderness.

They had a motive. Jane Dyson, the stronger character, overrode Mander's weak objections. She was going home, to her husband and family. But often her mind failed to grasp that concept, and she asked Dyson questions he could not answer.

It wasn't shadowy to him; it was not dreamlike. It had a pellucid, merciless clarity, the old man and the old woman hobbling and gasping along beside him, guiding him, talking sometimes in their strange, incomprehensible tongue, while he could not warn them, could not speak except in answer to direct orders. The drug, he learned, was a variant of pentothal.

"I seen them use it," Jane Dyson wheezed. "I got in and took a bottle of it. Lucky I did, too. But I knew what I was doing. They think I'm a fool—"

Mander he could not understand at all. But Jane Dyson could communicate with him, though she found it painful to articulate the words with sufficient clarity.

"Can't fool us . . . keeping us locked up! We'll fix 'em. Get to my folks . . . uh! Got to rest—"

She was inordinately fat, and Mander was cramped and crippled and bent into a bow. Under the clear moonlight it was utterly grotesque. It could not happen. They went on and on, dragging themselves painfully down gullies, up slopes, heading northward for some mysterious reason, and more and more the hands that had originally been merely guiding became a drag. The Old 'Uns clung to Dyson as their strength failed. They ordered him to keep on. They hung their weight on his aching arms and forced their brittle legs to keep moving.

There was a cleared field, and a house, with lights in the windows. Jane Dyson knocked impatiently on the door. When it opened, a taffy-haired girl who might have been seven stood looking up inquiringly. Dyson, paralyzed with the drug, saw shocked fear come into the clear blue eyes.

But it passed as Jane Dyson, thrusting forward, mumbled, "Is your mother home? Run get your

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mother, little girl. That's it."

The girl said, "Nobody's home but me. They won't be back till eleven."

The old woman had pushed her way in, and Mander urged Dyson across the threshold. The girl had retreated, still staring. Jane plopped herself into a relaxer and panted.

"Got to rest . . . where's your mother? Run get her. That's it. I want a nice cup of tea."

The girl was watching Dyson, fascinated by his paralysis. She sensed something amiss, but her standards of comparison were few. She fell back on polite habit.

"I can get you some maté, ma'am."

"Tea? Yes, yes. Hurry, Betty."

The girl went out. Mander crouched by a heating plate, mumbling. Dyson stood stiffly, his insides crawling coldly.

Jane Dyson muttered, "Glad to be home. Betty's my fourth, you know. They said the radiations would cause trouble . . . that fool scientist said I was susceptible, but the children were all normal. Somebody's been changing the house around. Where's Tom?" She eyed Dyson. "You're not Tom. I'm . . . what's this?" The girl came back with three maté gourds. Jane seized hers greedily.

"You mustn't boil the water too long, Betty," she said.

"I know. It takes out the air—"

"Now you be still. Sit down and be quiet."

Jane drank her maté noisily, but without comment. Dyson had a queer thought, but she and the child were at a contact point, passing each other, in a temporal dimension. They had much in common. The child had little experience, and the old woman had had much, but could no longer use hers. Yet real contact was impossible, for the only superiority the Old 'Un had over the child was the factor of age, and she could not let herself respect the child's mentality or even communicate, save with condescension.

Jane Dyson dozed. The child sat silent, watching and waiting, with occasional puzzled glances at Mander and Dyson. Once Jane ordered the girl to move to another chair so she wouldn't catch cold by the window—which wasn't open. Dyson thought of immortality and knew himself to be a fool.

For man has natural three-dimensional limits, and he also has four-dimensional ones, considering time as an extension. When he reaches those limits, he ceases to grow and mature, and forms rigidly within the mold of those limiting walls. It is stasis, which is retrogression unless all else stands still as well. A man who reaches his limits is tending toward subhumanity. Only when he becomes superhuman in time and space can immortality become practical.

Standing there, with only his mind free, Dyson had other ideas. The real answer might be entirely

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subjective. Immortality might be achieved without extending the superficial life span at all. If you could reason sufficiently fast, you could squeeze a year's reasoning into a day or a minute—

For example, each minute now lasted a hundred years.

Jane Dyson woke up with a start. She staggered to her feet. "We can't stay," she said. "I've got to get on home for dinner. Tell your mother—" She mumbled and hobbled toward the door. Mander, apathetically silent, followed. Only Jane remembered Dyson, and she called to him from the threshold. The little girl, standing wide-eyed, watched Dyson stiffly follow the others out.

They went on, but they found no more houses. At last weariness stopped the Old 'Uns. They sheltered in a gully. Mander crawled under a bush and tried to sleep. It was too cold. He got up, hobbled back, and pulled off the old woman's cloak. She fought him feebly. He got the cloak, went back and slept, snoring. Dyson could do nothing but stand motionless.

Jane Dyson dozed and woke and talked and dozed again. She brought up scattered, irrelevant memories of the past and spread them out for Dyson's approval. The situation was almost ideal. She had a listener who couldn't interrupt or get away.

"Thought they could fool an old woman like me. . . . I'm not old. Making me chew bones. Was that it? There was a bad time for a

FROZEN DEATH

A skier soars from the ski jump, a perfect leap—then suddenly he hesitates in mid-flight and plunges to the ground like a wounded bird. He never heard the bullet's killing whine. . . . A snow man reveals himself as the frosty coffin of a murdered corpse. . . . An iceboat chase brings The Shadow close on the heels of a vicious, clever killer.

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AT ALL NEWSSTANDS

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while. Where's Tom? Just leave me alone—"

And—"Telling me I was going to live forever! Scientists! He was right, though. I found that out. I *was* susceptible. It scared me. Everything going to pot, and Tom dying and me going on. . . . I got some pills. I'd got hold of them. More'n once I nearly swallowed them, too. You don't live forever if you take poison, that's certain. But I was smart. I waited a while. Time enough, I said. It's cold."

Her mottled, suety cheeks quivered. Dyson waited. He was beginning to feel sensation again. The hypnotic was wearing off.

Rattling, painful snores came from the invisible Mander, hidden in the gloom. A cold wind sighed down the gully. Jane Dyson's fat white face was pale in the faint light of distant, uninterested stars. She stirred and laughed a high, nickering laugh.

"I just had the funniest dream," she said. "I dreamed Tom was dead and I was old."

A copter picked up Dyson and the Old 'Uns half an hour later. But no explanations were made until he was back in the city, and even then they waited till Dyson had time to visit his secret laboratory and return. Then his uncle, Roger Peaslee, came into Dyson's apartment and sat down without invitation, looking sympathetic.

Dyson was white and sweating. He put down his glass, heavily loaded with whiskey, and stared at Peaslee.

"It was a frame, wasn't it?" he asked.

Peaslee nodded. He said, "Logic will convince a man he's wrong, *provided* the right argument is used. Sometimes it's impossible to find the right argument."

"When Administration sent me to the Home, I thought they'd found out I was doing immortality research."

"Yes. As soon as they found out, they sent you to Cozy Nook. That was the argument."

"Well, it was convincing. A whole night in the company of those—" Dyson drank. He didn't seem to feel it. He was still very pale.

Peaslee said, "We framed that escape, too, as you've guessed. But we kept an eye on you all along, to make sure you and the Old 'Uns would be safe."

"It was hard on them."

"No. They'll forget. They'll think it was another dream. Most of the time they don't know they're old, you see. A simple defense mechanism of senility. As for that little girl, I'll admit that wasn't planned. But no harm was done. The Old 'Uns didn't shock or horrify her. And nobody will believe her—which is fine, because the Archive myth has to stand for a while."

Dyson didn't answer. Peaslee looked at him more intently.

"Don't take it so hard, Sam. You lost an argument, that's all. You know now that age without

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increasing maturity doesn't mean anything. You've got to keep going ahead. Stasis is fatal. When we can find out how to overcome that, it'll be safe to make people immortal. Right?"

"Right."

"We want to study that laboratory of yours, before we dismantle it. Where's it hidden?"

Dyson told him. Then he poured himself another drink, downed it, and stood up. He picked up a sheet of paper from the table and tossed it at his uncle.

"Maybe you can use that, too," he said. "I was just down at the lab making some tests. I got scared."

"Eh?"

"Jane Dyson was especially susceptible to the particular radiations that cause immortality. Like cancer, you know. You can't inherit it, but you can inherit the susceptibility. Well I remembered that I'd been working a lot with those radiations, in secret. So I tested myself just now."

Peaslee opened his mouth, but he didn't say anything.

Dyson said, "It wouldn't have bothered most people—those radiations. But Jane Dyson passed on her susceptibility to me. It was accidental. But—I was exposed. *Why didn't Administration get on to me sooner!*"

Peaslee said slowly: "You don't mean—"

Dyson turned away from the look beginning to dawn in his uncle's eyes.

An hour later he stood in his bathroom alone, a sharp blade in his hand. The mirror watched him questioningly. He was drunk, but not very; it wouldn't be so easy to get drunk from now on. *From now on—*

He laid the cold edge of the knife against one wrist. A stroke would let out the blood from his immortal body, stop his immortal heart in mid-beat, turn him from an immortal into a very mortal corpse. His face felt stiff. The whiskey taste in his mouth couldn't rinse out the musty smell of senility.

The thought: *Of course there's Marta. Fourscore and ten is the normal span. If I cut it off now, I'll be losing a good many years. When I'm ninety, it would be time enough. Suppose I went on for a little while longer, married Marta—*

He looked at the knife and then into the glass. He said aloud:

"When I'm ninety I'll commit suicide."

Young, firm-fleshed, ruddy with health, his face looked enigmatically back at him from the mirror. Age would come of course. As for death—

There would be time enough, sixty years from now, when he faced a mirror and knew that he had gone beyond maturity and into the darkening, twilight years. He would know, when the time came—of course he would know!

And in Cozy Nook, Jane Dyson stirred and moaned in her sleep, dreaming that she was old.

THE END.

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HAND OF THE GODS

BY A. E. VAN VOGT

***Clane**, the Child of the Gods, might be loved by the Atom Gods, but not by the sharp-minded old woman who ruled the Empire —and that was a very practical and dangerous matter indeed!*

At twenty, Clane wrote his first book. It was a cautiously worded, thin volume about old legends. And what was important about it was not that it attempted to dispel supersitions about the vanished golden era which the atom gods had destroyed, but that for weeks it required him to go every day into the palace library, where, with the help of three secretary-slaves —two men and a woman—he did the necessary research work.

It was in the library that the Lady Lydia, his stepgrandmother, saw him one day.

She had almost forgotten that he existed. But she saw him now for the first time under conditions that were favorable to his appearance. He was modestly attired in the fatigue gown of a temple scientist, a costume which was effective for covering up his physical deformations. There were folds of cloth to conceal his mutated arms so skillfully that his normal human hands came out into the open as if they were the natural extensions of a healthy body. The cloak was drawn up into a narrow, not unattractive band around his neck, which served to hide the subtly mutated shoulders and the unhuman chest formation. Above the collar, Lord Clane's head reared with all the pride of a young lordling.

It was a head to make any woman look twice, delicately beautiful, with a remarkably clear skin. Lydia, who had never seen her husband's grandson, except at a distance—Clane had made sure of that—felt a constricting fear in her heart.

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"By Uranium!" she thought. "Another great man. As if I didn't have enough trouble trying to get Tews back from exile."

It hardly seemed likely that death would be necessary for a mutation. But if she ever hoped to have Tews inherit the empire, then all the more direct heirs would have to be taken care of in some way. Standing there, she added this new relative to her list of the more dangerous kin of the ailing Lord Leader.

She saw that Clane was looking at her. His face had changed, stiffened, lost some of its good looks, and that brought a memory of things she had heard about him. That he was easily upset emotionally. The prospect interested her. She walked towards him, a thin smile on her long, handsome countenance.

Twice, as she stood tall before him, he tried to get up. And failed each time. All the color was gone from his cheeks, his face even more strained looking than it had been, ashen and unnatural, twisted, changed, the last shape of beauty gone from it. His lips worked with the effort at speech, but only a muted burst of unintelligible sounds issued forth.

Lydia grew aware that the young slave woman-secretary was almost as agitated as her master. The creature looked beseechingly at Lydia, finally gasped:

"May I speak, your excellency?"

That shocked. Slaves didn't speak except when spoken to. It was not just a rule or a regulation dependent upon the whim of the particular owner; it was the law of the land, and anybody could report breach as a misdemeanor, and collect half the fine which was subsequently levied from the slave's master. What dazed Lady Lydia was that *she* should have been the victim of such a degrading experience. She was so stunned that the young woman had time to gasp:

"You must forgive him. He is subject to fits of nervous paralysis, when he can neither move nor speak. The sight of his illustrious grandmother coming upon him by surprise—"

That was as far as she got. Lydia found her voice. She snapped:

"It is too bad that all slaves are not similarly afflicted. How dare you speak to me?"

She stopped, catching herself sharply. It was not often that she lost her temper, and she had no intention of letting the situation get out of hand. The slave girl was sagging away as if she had been struck with a violence beyond her power to resist. Lydia watched the process of disintegration curiously. There was only one possible explanation for a slave speaking up so boldly for her master. She must be one of his favorite mistresses. And the odd thing, in this case, was that the slave herself seemed to approve of the relationship, or she wouldn't have been so anxious for him.

It would appear, thought Lydia, *that this mutation relative of mine*

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can make himself attractive in spite of his deformities, and that it isn't only a case of a slave girl compelled by her circumstances.

It seemed to her that the moment had potentialities. "What," she said, "is your name?"

"Selk." The young woman spoke huskily.

"Oh, a Martian."

The Martian war, some years before, had produced some hundreds of thousands of husky, good-looking boy and girl Martians for the slave schools to train.

Lydia's plan grew clear. She would have the girl assassinated, and so put the first desperate fear into the mutation. That should hold him until she had succeeded in bringing Tews back from exile to supreme power. After all, he was not too important. It would be impossible for a despised mutation ever to become Lord Leader.

He had to be put out of the way in the long run, because the Linn party would otherwise try to make use of him against Tews and herself.

She paused for a last look down at Clane. He was sitting as rigid as a board, his eyes glazed, his face still colorless and unnatural. She made no effort to conceal her contempt as, with a flounce of her skirt, she turned and walked away, followed by her ladies and personal slaves.

Slaves were sometimes trained to be assassins. The advantage of using them was that they could not be witnesses in court either for or against the accused. But Lydia had long discovered that, if anything went wrong, if a crisis arose as a result of the murder attempt, a slave assassin did not have the same determination to win over obstacles. Slaves took to their heels at the slightest provocation, and returned with fantastic accounts of the odds that had defeated them.

She used former knights and sons of knights, whose families had been degraded from their rank because they were penniless. Such men had a desperate will to acquire money, and when they failed she could usually count on a plausible reason.

She had a horror of not knowing the facts. For more than thirty of her fifty-five years her mind had been a nonsaturable sponge for details and ever more details.

It was accordingly of more than ordinary interest to her when the two knights she had hired to murder her stepgrandson's slave girl, Selk, reported that they had been unable to find the girl.

"There is no such person now attached to Lord Clane's city household."

Her informant, a slim youth named Meerl, spoke with that mixture of boldness and respect which the more devil-may-care assassins affected when talking to high personages.

"Lady," he went on with a bow and a smile, "I think you have been outwitted."

"I'll do the thinking," said Lydia

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with asperity. "You're a sword or a knife with a strong arm to wield. Nothing more."

"And a good brain to direct it," said Meerl.

Lydia scarcely heard. Her retort had been almost automatic. Because—could it be? Was it possible that Clane had realized what she would do?

What startled her was the decisiveness of it, the prompt action that had been taken on the basis of what would only have been a suspicion. The world was full of people who never did anything about their suspicions. The group that did was always in a special class. If Clane had consciously frustrated her, then he was even more dangerous than she had thought. She'd have to plan her next move with care.

She grew aware that the two men were still standing before her. She glared at them.

"Well, what are you waiting for? You know there is no money if you fail."

"Gracious lady," said Meerl, "we did not fail. You failed."

Lydia hesitated, impressed by the fairness of the thrust. She had a certain grudging respect for this particular assassin.

"Fifty percent," she said.

She tossed forward a pouch of money. It was skillfully caught. The men bowed quickly, stiffly, with a flash of white teeth and a clank of steel. They whirled and disappeared through thick portieres that concealed the door by which they had entered.

Lydia sat alone with her thoughts, but not for long. A knock came on another door, and one of her ladies in waiting entered, holding a sealed letter in her hand.

"This arrived, madam, while you were engaged."

Lydia's eyebrows went up a little when she saw that the letter was from Clane. She read it, tight-lipped:

To My Most Gracious Grandmother:

I offer my sincere apologies for the insult and distress which I caused your ladyship yesterday in the library. I can only plead that my nervous afflictions are well known in the family, and that, when I am assailed, it is beyond my power to control myself.

I also offer apologies for the action of my slave girl in speaking to you. It was my first intention to turn her over to you for punishment. But then it struck me that you were so tremendously busy at all times, and besides she scarcely merited your attention. Accordingly, I have had her sold in the country to a dealer in labor, and she will no doubt learn to regret her insolence.

With renewed humble apologies, I remain,

Your obedient grandson,
Clane

Reluctantly, the Lady Linn was compelled to admire the letter. Now she would never know whether she had been outwitted or victorious.

I suppose, she thought acridly, *I could at great expense discover if he merely sent her to his country estate, there to wait until I have forgotten what she looks like. Or could I even do that?*

She paused to consider the difficulties. She would have to send

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as an investigator someone who had seen the girl. Who? She looked up.

"Dalat."

The woman who had brought the letter curtsied.

"Yes?"

"What did that slave girl in the library yesterday look like?"

Dalat was d i s c o n c e r t e d. "W-why, I don't think I noticed, your ladyship. A blonde, I think."

"A b l o n d e!" Explosively. "Why, you numskull. That girl had the most fancy head of golden hair that I've seen in several years —and you didn't notice."

Dalat was herself again. "I am not accustomed to remembering slaves," she said.

"Get out of here," said Lydia. But she said it in a flat tone, without emotion.

Here was defeat.

She shrugged finally. After all, it was only an idea she had had. Her problem was to get Tews back to Linn. Lord Clane, the only mutation ever born into the family of the Lord Leader, could wait.

Nevertheless, the failure rankled.

The Lord Leader had over a period of years become an ailing old man, who could not make up his mind. At seventy-one, he was almost blind in his left eye, and only his voice remained strong. He had a thunderous baritone that still struck terror into the hearts of criminals when he sat on the chair of high judgment, a duty which, because of its sedentary nature, he cultivated more and more as the swift months of his declining years passed by.

He was greatly surprised one day to see Clane turn up in the palace court as a defense counsel for a knight. He stopped the presentation of the case to ask some questions.

"Have you experience in the lower courts?"

"Yes, Leader."

"Hm-m-m, why was I not told?"

The mutation had suddenly a strained look on his face, as if the pressure of being the center of attention was proving too much for him. The Lord Leader recalled the young man's affliction, and said hastily:

"Proceed with the case. I shall talk to you later."

The case was an unimportant one involving equity rights. It had obviously been taken by Clane because of its simple, just aspects. For a first case in the highest court it had been well selected. The old man was pleased, and gave the favorable verdict with satisfaction.

As usual, however, he had overestimated his strength. And so, he was finally forced to retire quickly, with but a word to Clane:

"I shall come to call on you one of these days. I have been wanting to see your home."

That night he made the mistake of sitting on the balcony too long without a blanket. He caught a cold, and spent the whole of the

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month that followed in bed. It was there, helpless on his back, acutely aware of his weak body, fully, clearly conscious at last that he had at most a few years to live, that the Lord Leader realized finally the necessity of selecting an heir. In spite of his personal dislike for Tews, he found himself listening, at first grudgingly, then more amenably, to his wife.

"Remember," she said, again and again, "your dream of bequeathing to the world a unified empire. Surely, you cannot become sentimental about it at the last minute. Lords Jerrin and Draid are still too young. Jerrin, of course, is the most brilliant young man of his generation. He is obviously a future Lord Leader, and should be named so in your will. But not yet. You cannot hand over the solar system to a youngster of twenty-four."

The Lord Leader stirred uneasily. He noticed that there was not a word in her argument about the reason for Tews' exile. And that she was too clever ever to allow into her voice the faintest suggestion that, behind her logic, was the emotional fact that Tews was her son.

"There are of course," Lydia went on, "the boy's uncles on their mother's side, both amiable administrators but lacking in will." And then there are your daughters and sons-in-law, and their children, and your nieces and nephews."

"Forget them." The Lord Leader, gaunt and intent on the pillow, moved a hand weakly in dismissal of the suggestion. He was not interested in the second-raters. "You have forgotten," he said finally, "Clane."

"A mutation!" said Lydia, surprised. "Are you serious?"

The lord of Linn was silent. He knew better, of course. Mutations were despised, hated, and, paradoxically, feared. No normal person would ever accept their domination. The suggestion was actually meaningless. But he knew why he had made it. Delay. He realized he was being pushed inexorably to choosing as his heir Lydia's plumpish son by her first husband.

"If you considered your own blood only," urged Lydia, "it would be just another case of imperial succession so common among our tributary monarchies and among the barbarians of Aiszh and Venus and Mars. Politically it would be meaningless. If, however, you strike across party lines, your action will speak for your supreme patriotism. In no other way could you so finally and unanswerably convince the world that you have only its interest at heart."

The old scoundrel, dimmed though his spirit and intellect were by illness and age, was not quite so simple as that. He knew what they were saying under the pillars, that Lydia was molding him like a piece of putty to her plans.

Not that such opinions disturbed him very much. The tireless propaganda of his enemies and of mischief makers and gossips had dinned into his ears for nearly fifty

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years, and he had become immune to the chatter.

In the end the decisive factor was only partly Lydia's arguments, only partly his own desperate realization that he had little choice. The unexpected factor was a visit to his bedside by the younger of his two daughters by his first marriage. She asked that he grant her a divorce from her present husband, and permit her to marry the exiled Tews.

"I have always," she said, "been in love with Tews, and only Tews, and I am willing to join him in exile."

The prospect was so dazzling that, for once, the old man was completely fooled. It did not even occur to him that Lydia had spent two days convincing the cautious Gudrun that here was her only chance of becoming first lady of Linn.

"Otherwise," Lydia had pointed out, "you'll be just another relative, dependent upon the whim of the reigning Lady Leader."

The Linn of Linn suspected absolutely nothing of that behind-the-scenes connivance. His daughter married to Lord Tews. The possibilities warmed his chilling blood. She was too old, of course, to have any more children, but she would serve Tews as Lydia had him, a perfect foil, a perfect representative of his own political group. *His* daughter!

I must, he thought, *go and see what Clane thinks. Meanwhile I can send for Tews on a tentative basis.*

He didn't say that out loud. No one in the family except himself realized the enormous extent of the knowledge that the long-dead temple scientist Joquin had bequeathed to Clane. The Lord Leader preferred to keep the information in his own mind. He knew Lydia's propensity for hiring assassins, and it wouldn't do to subject Clane to more than ordinary danger from that source.

He regarded the mutation as an unsuspected stabilizing force during the chaos that might follow his death. He wrote the letter inviting Tews to return to Linn, and, a week later, finally out of bed, had himself carried to Clane's residence in the west suburbs. He remained overnight, and, returning the next day, began to discharge a score of key men whom Lydia had slipped into administrative positions on occasions when he was too weary to know what the urgent business was for which he was signing papers.

Lydia said nothing, but she noted the sequence of events. A visit to Clane, then action against her men. She pondered that for some days, and then, the day before Tews was due, she paid her first visit to the modest looking home of Lord Clane Linn, taking care that she was not expected. She had heard vague accounts of the estate.

The reality surpassed anything she had ever imagined or heard.

For seven years, Tews had lived on Awai in the Great Sea. He had a small property on the largest

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island of the group, and, after his disgrace, his mother had suggested that he retire there rather than to one of his more sumptuous mainland estates. A shrewd, careful man, he recognized the value of the advice. His role, if he hoped to remain alive, must be sackcloth and ashes.

At first it was purposeful cunning. In Linn, Lydia wracked her brains for explanations and finally came out with the statement that her son had wearied and sickened of politics, and retired to a life of meditation beyond the poisoned waters. For a long time, so plausible and convincing was her sighing, tired way of describing his feelings —as if she, too, longed for the surcease of rest from the duties of her position—that the story was actually believed. Patrons, governors and ambassadors, flying out in spaceships from Linn to the continents across the ocean, paused as a matter of course to pay their respects to the son of Lydia.

Gradually, they began to catch on that he was out of favor. Desperately, terribly dangerously out of favor. The stiff-faced silence of the Lord Leader when Tews was mentioned was reported finally among administrators and politicians everywhere. People were tremendously astute, once they realized. It was recalled that Tews had hastily departed from Linn at the time when the news of the death of General Lord Creg, son of the Lord Leader, was first brought from Mars. At the time his departure had scarcely been remarked. Now it was remembered and conclusions drawn. Great ships, carrying high government officials, ceased to stop, so that the officials could float down for lunch with Lord Tews. But that was the least important aspect. The deadly danger was that some zealous and ambitious individual knight might seek to gain the favor of Linn of Linn by murdering his stepson.

Lydia herself nipped several such plots in the bud. But each conspiracy was such a visible strain on her nervous system that the Lord Leader unfroze sufficiently to bestow on Tews a secondary military position on Awai. It was actually an insulting offer, but the panic-stricken Lydia persuaded Tews to accept it as a means of preserving his life until she could do more for him. The position, and the power that went with it, arrived just in time.

He had formed a habit of attending lectures at the University of Awai. One day, a term having expired, and a new one scheduled to begin, he made the customary application for renewal. The professor in charge took the opportunity during the first lecture of the first semester of the new term —the first lecture was free and open to the public—to inform him before the entire audience that, since the lists were full, his application was being rejected, and would have to be put over until the following year, when, of course, it would be considered again "on its merits."

It was the act of a neurotic fool. But Tews would have let it pass

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for the time being if the audience, recognizing a fallen giant, had not started catcalling and threatening. The uproar grew with the minutes, and, experienced leader of men that he was, Tews realized that a mob mood was building up, which must be smashed if he hoped to continue living in safety on the island. He climbed to his feet, and, since most of the audience was standing on seats and benches he managed to reach the outside before the yelling individuals who saw him were able to attract the attention of the yelling crowd that didn't.

Tews went straight to the outdoor restaurant where his new guard was waiting. It was a rowdy crew, but recently arrived from Linn, and with enough basic discipline to follow him back into the lecture room. There was a pause in the confusion when the glinting line of spears wedged towards the platform. In a minute, before an abruptly subdued audience, the startled professor was being stripped and tied to a chair. The twenty-five lashes that he received then ended for good the outburst of hatred against Tews.

He returned to his villa that afternoon, and made no further effort to participate in the activities of the community. The isolation affected him profoundly. He became tremendously observant. He noticed in amazement for the first time that the islanders swam at night in the ocean. Swam! In water that had been poisoned since legendary times by the atom gods. Was it possible the water was no longer deadly? He noted the point for possible future reference, and for the first time grew interested in the name the islanders had for the great ocean. Passfic. Continental people had moved inland to escape the fumes of the deadly seas, and they had forgotten the ancient names.

During the long months of aloneness that followed his retreat to his villa, Tews' mind dwelt many times critically upon his life in Linn. He began to see the madness of it, and the endless skulduggery. He read with more and more amazement the letters of his mother, outlining what she was doing. It was a tale of endless cunnings, conspiracies and murders, written in a simple code that was effective because it was based on words the extra-original meanings of which were known only to his mother and himself.

His amazement became disgust, and disgust grew into the first comprehension of the greatness of his stepfather, the Lord Leader.

But he's wrong, Tews thought intently. *The way to a unified empire is not through a continuation of absolute power for one man. The old republic never had a chance, since the factions came up from the days of the two-king system. But now, after decades of virtual non-party patriotism under my honorable stepfather, it should be possible to restore the republic with the very good possibility that this time it will work. That must be my task if I can ever return to Linn.*

The messenger from the Lord Leader inviting his return arrived on the same ship as another letter

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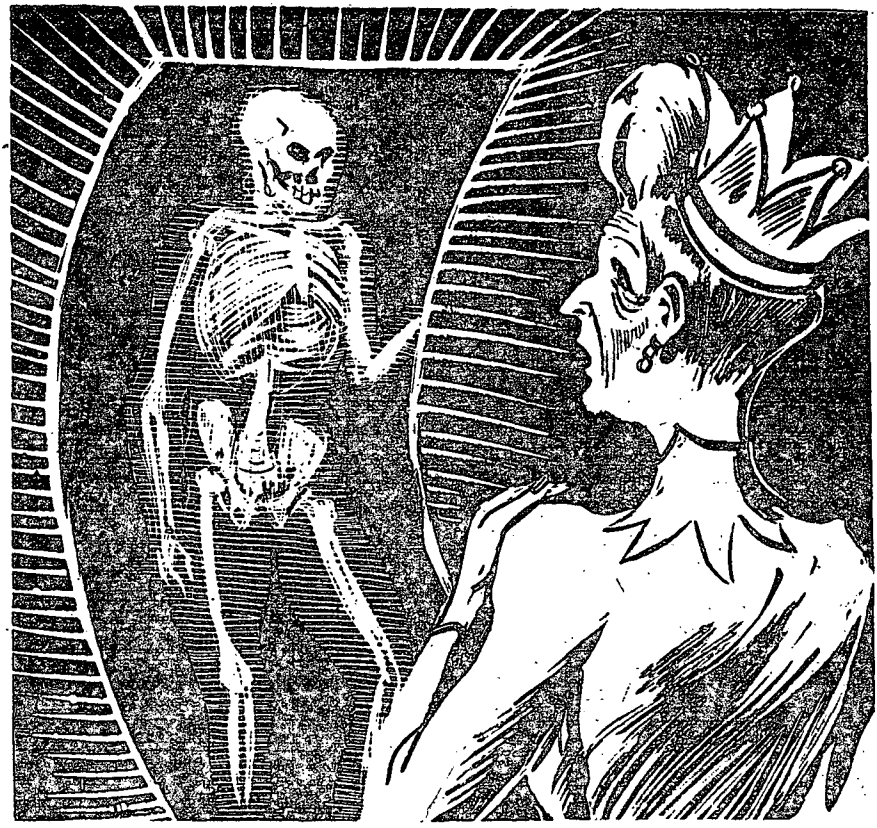

from his mother. Hers sounded as if it had been written in breathless haste, but it contained an explanation of how his recall had been accomplished. The price shocked Tews.

What, he thought, *marry Gudrun!"*

It took an hour for his nerves to calm sufficiently for him even to consider the proposition. His plan, it seemed to him finally, was too important to be allowed to fail because of his distaste for a woman whose interest in men ran not so much to quality as quantity. And it wasn't as if he was bound to another woman. His wife, seven years before, on discovering that his departure from Linn might be permanent, hastily persuaded her father to declare them divorced.

Yes, he was free to marry.

Lydia, on the way to the home of her stepgrandson, pondered her situation. She was not satisfied. A dozen of her schemes were coming to a head; and here she was going to see Lord Clane, a com-

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pletely unknown factor. Thinking about it from that viewpoint, she felt astonished. What possible danger, she asked herself again and again, could a mutation be to her?

Even as those thoughts infuriated the surface of her mind, deep inside she knew better. There was something here. *Something.* The old man would never bother with a nonentity. He was either quiet with the quietness of weariness, or utterly impatient. Young people particularly enraged him easily, and if Clane was an exception, then there was a reason.

From a distance, Clane's residence looked small. There was brush in the foreground, and a solid wall of trees across the entire eight-hundred-foot front of the estate. The house peaked a few feet above a mantle of pines and evergreens. As her chair drew nearer it, Lydia decided it was a three-story building, which was certainly minuscule beside the palaces of the other Linns. Her bearers puffed up a hill, trotted past a pleasant arbor of trees, and came after a little to a low, massive fence that had not been visible from below. Lydia, always alert for military obstacles, had her chair put down. She climbed out, conscious that a cool, sweet breeze was blowing where, a moment before, had been only the dead heat of a stifling summer day. The air was rich with the perfume of trees and green things.

She walked slowly along the fence, noting that it was skillfully hidden from the street below by an unbroken hedge, although it showed through at this close range. She recognized the material as similar to that of which the temples of the scientists was constructed, only there was no visible lead lining. She estimated the height of the fence at three feet, and its thickness about three and a half. It was fat and squat and defensively useless.

When I was young, she thought, *I could have jumped over it myself.*

She returned to the chair, annoyed because she couldn't fathom its purpose, and yet couldn't quite believe it had no purpose. It was even more disconcerting to discover a hundred feet farther along the walk that the gate was not a closure but an opening in the wall, and that there was no guard in sight. In a minute more, the bearers had carried her inside, through a tunnel of interwoven shrubs shadowed by towering trees, and then to an open lawn. That was where the real surprise began.

"Stop!" said the Lady Leader Lydia.

An enormous combination meadow and garden spread from the edge of the trees. She had an eye for size, and, without consciously thinking about it, she guessed that fifteen acres were visible from her vantage point. A gracious stream meandered diagonally across the meadow. Along its banks scores of guest homes had been built, low, sleek, be-windowed structures, each with its overhanging shade trees. The house, a square-built affair, towered to her right. At the far end of the grounds were five spaceships neatly laid out side by side. And

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everywhere were people. Men and women singly and in groups, sitting in chairs, walking, working, reading, writing, drawing and painting. Thoughtfully, Lydia walked over to a painter, who sat with his easel and palette a scant dozen yards from her. He was painting the scene before him, and he paid no attention to her. She was not accustomed to being ignored. She said sharply:

"What is all this?" She waved one arm to take in the activities of the estate. "What is going on here?"

The young man shrugged. He dabbed thoughtfully at the scene he was painting, then, still without looking up, said:

"Here, madam, you have the center of Linn. Here the thought and opinion of the empire is created and cast into molds for public consumption. Ideas born here, once they are spread among the masses, become the mores of the nation and the solar system. To be invited here is an unequaled honor, for it means that your work as a scholar or artist has received the ultimate recognition that power and money can give. Madam, whoever you are, I welcome you to the intellectual center of the world. You would not be here if you had not some unsurpassed achievement to your credit. However, I beg of you, please do not tell me what it is until this evening when I shall be happy to lend you both my ears. And now, old and successful woman, good day to you."

Lydia withdrew thoughtfully. Her impulse, to have the young man stripped and lashed, yielded before a sudden desire to remain incognito as long as possible while she explored this unsuspected outdoor salon.

It was a universe of strangers. Not once did she see a face she recognized. These people, whatever their achievements, were not the publicized great men of the empire. She saw no patrons and only one man with the insignia of a knight on his coat. And when she approached him, she recognized from the alien religious symbol connected with the other markings, that his knighthood was of provincial origin.

He was standing beside a fountain near a cluster of guest homes. The fountain spewed forth a skillfully blended mixture of water and smoke. It made a pretty show, the smoke rising up in thin, steamlike clouds. As she paused beside the fountain there was a cessation of the cooling breeze, and she felt a wave of heat that reminded her of steaming hot lower town. Lydia concentrated on the man and on her desire for information.

"I'm new here," she said engagingly. "Has this center been long in existence?"

"About three years, madam. After all, our young prince is only twenty-four!"

"Prince?" asked Lydia.

The knight, a rugged faced individual of forty, was apologetic.

"I beg your pardon. It is an old word of my province, signifying

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a leader of high birth. I discovered on my various journeys into the pits, where the atom gods live, and where once cities existed, that the name was of legendary origin. This is according to old books I found in remnants of buildings."

Lydia said, shocked: "You went down into one of the reputed homes of the gods, where the eternal fires burn?"

The knight chuckled. "Some of them are less eternal than others, I discovered."

"But weren't you afraid of being physically damaged?"

"Madam," shrugged the other, "I am nearly fifty years old. Why should I worry if my blood is slightly damaged by the aura of the gods."

Lydia hesitated, interested. But she had let herself be drawn from her purpose. "Prince," she repeated now, grimly. Applied to Clane, the title had a ring she didn't like. Prince Clane. It was rather stunning to discover that there were men who thought of him as a leader. What had happened to the old prejudices against mutations? She was about to speak again when, for the first time, she actually looked at the fountain.

She pulled back with a gasp. The water was bubbling. A mist of steam arose from it. Her gaze shot up to the spout, and now she saw that it was not smoke and water spewing up from it. It was boiling, steaming water. Water that roiled and rushed and roared. More hot water than she had ever seen from an artificial source. Memory came of the blackened pots in which slaves heated her daily hot water needs. And she felt a spurt of pure jealousy at the extravagant luxury of a fountain of boiling water on one's grounds.

"But how does he do it?" she gasped. "Has he tapped an underground hot spring?"

"No madam, the water comes from the stream over there?" The knight pointed. "It is brought here in tiled pipes, and then runs off into the various guest homes."

"Is there some arrangement of hot coals?"

"Nothing, madam." The knight was beginning to enjoy himself visibly. "There is an opening under the fountain, and you can look in if you wish."

Lydia wished. She was fascinated. She realized that she had let herself be distracted, but for the moment that was of secondary importance. She watched with bright eyes as the knight opened the little door in the cement, and then she stooped beside him to peer in. It took several seconds to become accustomed to the dim light inside, but finally she was able to make out the massive base of the spout, and then the six-inch pipe that ran into it. Lydia straightened slowly. The man shut the door matter-of-factly. As he turned, she asked:

"But how does it work?"

The night shrugged. "Some say that the water gods of Mars have been friendly to him ever since they helped his late father to win the war against the Martians. You will recall that the canal waters boiled in a frightful fury, thus confusing

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the Martians as they were attacked. And then, again, others say that it is the atom gods helping their favorite mutation."

"Oh!" said Lydia. This was the kind of talk she could understand. She had never in her life worried about what the gods might think of her actions. And she was not going to start now. She straightened and glared imperiously at the man.

"Don't be such a fool," she said. "A man who has dared to penetrate the homes of the gods should have more sense than to repeat old wives' tales like that."

The man gaped. She turned away before he could speak, and marched off to her chair. "To the house!" she commanded her slaves.

They had her at the front entrance of the residence before it struck her that she had not learned the tremendous and precious secret of the boiling fountain.

She caught Clane by surprise. She entered the house in her flamboyant manner, and by the time a slave saw her, and ran to his master's laboratory to bring the news of her coming, it was too late. She loomed in the doorway, as Clane turned from a corpse he was dissecting. To her immense disappointment he did not freeze up in one of his emotional spasms. She had expected it, and her plan was to look over the laboratory quietly and without interference.

But Clane came towards her. "Honorable grandmother," he said. And knelt to kiss her hand. He came up with an easy grace. "I hope," he said with an apparent eagerness, "that you will have the time and inclination to see my home and my work. Both have interesting features."

His whole manner was so human, so engaging, that she was disconcerted anew, not an easy emotion for her to experience. She shook off the weakness impatiently. Her first words affirmed her purpose in visiting him:

"Yes," she said, "I shall be happy to see your home. I have been intending for some years to visit you, but I have been so busy." She sighed. "The duties of statecraft can be very onerous."

The beautiful face looked properly sympathetic. A delicate hand pointed at the dead body, which those slim fingers had been working over. The soft voice informed that the purpose of the dissection was to discover the position pattern of the organs and muscles and bones.

"I have cut open dead mutations," Clane said, "and compared them with normal bodies."

Lydia could not quite follow the purpose. After all, each mutation was different, depending upon the way the god forces had affected them. She said as much. The glowing blue eyes of the mutation looked at her speculatively.

"It is commonly known," he said, "that mutations seldom live beyond the age of thirty. Naturally," he went on, with a faint smile, "since I am now within six years of that milestone, the possibility weighs upon me. Joquin, that astute old

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scientist, who unfortunately is now dead, believed that the deaths resulted from inner tensions, due to the manner in which mutations were treated by their fellows. He felt that if those tensions could be removed, as they have been to some extent in me, a normal span of life would follow as also would normal intelligence. I'd better correct that. He believed that a mutation, given a chance, would be able to realize his normal *potentialities,* which might be either super- or sub-normal compared to human beings."

Clane smiled. "So far," he said, "I have noticed nothing out of the ordinary in myself."

Lydia thought of the boiling fountain, and felt a chill. *That old fool, Joquin,* she thought in a cold fury. *Why didn't I pay more attention to what he was doing? He's created an alien mind in our midst within striking distance of the top of the power group of the empire.*

The sense of immense disaster possibilities grew. *Death,* she thought, *within hours after the old man is gone. No risks can be taken with this creature.*

Suddenly, she was interested in nothing but the accessibility of the various rooms of the house to assassins. Clane seemed to realize her mood, for after a brief tour of the laboratory, of which she remembered little, he began the journey from room to room. Now, her eyes and attention sharpened. She peered into doors, examined window arrangements, and did not fail to note with satisfaction the universal carpeting of the floors. Meerl would be able to attack without warning sounds.

"And your bedroom?" she asked finally.

"We're coming to it," said Clane. "It's downstairs, adjoining the laboratory. There's something else in the lab that I want to show you. I wasn't sure at first that I would, but now"—his smile was angelic—"I will."

The corridor that led from the living room to the bedroom was almost wide enough to be an anteroom. The walls were hung with drapes from floor to ceiling, which was odd. Lydia, who had no inhibitions, lifted one drape, and peered under it. The wall was vaguely warm, like an ember, and it was built of temple stone. She looked at Clane questioningly.

"I have some god metals in the house. Naturally, I am taking no chances. There's another corridor leading from the laboratory to the bedroom."

What interested Lydia was that neither door of the bedroom had either a lock or a bolt on it. She thought about that tensely, as she followed Clane through the anteroom that led to the laboratory. He wouldn't, it seemed to her, leave himself so unprotected forever.

The assassins must strike before he grew alarmed, the sooner the better. Regretfully, she decided it would have to wait until Tews was confirmed as heir to the throne. She grew aware that Clane had paused beside a dark box.

"Gelo Greeant," he said, "brought

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this to me from one of his journeys into the realms of the gods. I'm going to step inside, and you go around to the right there, and look into the dark glass. You will be amazed."

Lydia obeyed, puzzled. For a moment, after Clane had disappeared inside, the glass remained dark. Then it began to glow faintly. She retreated a step before that alien shiningness; then, remembering who she was, stood her ground. And then she screamed.

A skeleton glowed through the glass. And the shadow of a beating heart, the shadow of expanding and contracting lungs. As she watched, petrified now, the skeleton arm moved, and seemed to come towards her, but drew back again. To her paralyzed brain came at last comprehension.

She was looking at the inside of a living human being. At Clane. Abruptly, that interested her. *Clane.* Like lightning, her eyes examined his bone structure. She noticed the cluster of ribs around his heart and lungs, the special thickness of his collar bones. Her gaze flashed down towards his kidneys, but this time she was too slow. The light faded, and went out. Clane emerged from the box.

"Well," he asked, pleased, "what do you think of my little gift from the gods?"

The phraseology startled Lydia. All the way home, she thought of it. Gift from the gods! In a sense it was. The atom gods had sent their mutation a method for seeing himself, for studying his own body. What could *their* purpose be?

She had a conviction that, if the gods really existed, and if, as seemed evident, they were helping Clane, then the Deities of the Atom were again—as they had in legendary times—interfering with human affairs.

The sinking sensation that came had only one hopeful rhythm. And that was like a drumbeat inside her: Kill! And soon. *Soon!*

But the days passed. And the demands of political stability absorbed all her attention. Nevertheless, in the midst of a score of new troubles, she did not forget Clane.

The return of Tews was a triumph for his mother's diplomacy and a great moment for himself. His ship came down in the square of the pillars, and there, before an immense cheering throng, he was welcomed by the Lord Leader and the entire patronate. The parade that followed was led by a unit of five thousand glitteringly arrayed horse-mounted troops, followed by ten thousand foot soldiers, one thousan engineers and scores of mechanical engines for throwing weights and rocks at defensive barriers. Then came the Lord Leader, Lydia and Tews, and the three hundred patrons and six hundred knights of the empire. The rear of the parade was brought up by another cavalry unit of five thousand men.

From the rostrum that jutted out from the palace, the Lord Leader, his lion's voice undimmed by age, welcomed his stepson. All the lies

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that had ever been told about the reason for Tews' exile were coolly and grandly confirmed now. He had gone away to meditate. He had wearied of the cunnings and artifices of government. He had returned only after repeated pleadings on the part of his mother and of the Lord Leader.

"As you know," concluded the Lord Leader, "seven years ago, I was bereft of my natural heir in the

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moment of the greatest military triumph the empire has ever experienced, the conquest of the Martians. Today, as I stand before you, no longer young, no longer able to bear the full weight of either military or political command, it is an immeasurable relief to me to be able to tell the people with confidence and conviction: Here in this modest and unassuming member of my family, the son of my dear wife, Lydia, I ask you to put your trust. To the soldiers I say, this is no weakling. Remember the Cimbri, conquered under his skillful generalship when he was but a youth of twenty-five. Particularly, I direct my words to the hard-pressed soldiers on Venus, where false leaders have misled the island provinces of the fierce Venusian tribes to an ill-fated rebellion. Ill-fated, I say, because as soon as possible Tews will be there with the largest army assembled by the empire since the war of the Martians. I am going to venture a prediction. I am going to predict that within two years the Venusian leaders will be hanging on long lines of posts of the type they are now using to murder prisoners. I predict that these hangings will be achieved by *Co-Lord Leader* General Tews, whom I now publicly appoint my heir and successor, and on whose behalf I now say, Take warning, all those who would have ill befall the empire. Here is the man who will confound you and your schemes."

The dazzled Tews, who had been advised by his mother to the extent of the victory she had won for him, stepped forward to acknowledge the cheers and to say a few words. "Not too much," his mother had warned him. "Be noncommittal." But Lord Tews had other plans. He had carefully thought out the pattern of his future actions, and he had one announcement to make, in addition to a ringing acceptance of the military leadership that had been offered him, and a promise that the Venusian leaders would indeed suffer the fate which the Linn of Linn had promised them, the announcement had to do with the title of Co-Lord Leader, which had been bestowed on him.

"I am sure," he told the crowd, "that you will agree with me that the title of Lord Leader belongs uniquely to the first and greatest man of Linn. I therefore request, and will hold it mandatory upon government leaders, that I be addressed as Lord Adviser. It shall be my pleasure to act as adviser to both the Lord Leader and to the patronate, and it is in this role that I wish to be known henceforth to the people of the mighty Linnan empire. Thank you for listening to me, and I now advise you that there will be games for three days in the bowls, and that free food will be served throughout the city during that time at my expense. Go and have a good time, and may the gods of the atoms bring you all good luck."

During the first minute after he had finished, Lydia was appalled. Was Tews mad to have refused the title of Lord Leader? The joyful

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yelping of the mob soothed her a little, and then, slowly, as she followed Tews and the old man along the promenade that led from the rostrum to the palace gates, she began to realize the cleverness of the new title. Lord Adviser. Why, it would be a veritable shield against the charges of those who were always striving to rouse the people against the absolute government of the Linns. It was clear that the long exile had sharpened rather than dulled the mind of her son.

The Lord Leader, too, as the days passed, and the new character of Tews came to the fore, was having regrets. Certain restrictions, which he had imposed upon his stepson during his residence on Awai, seemed unduly severe and ill-advised in retrospect. He should not, for instance, have permitted Tews' wife to divorce him, but should instead have insisted that she accompany him.

It seemed to him now that there was only one solution. He rushed the marriage between Tews and Gudrun, and then dispatched them to Venus on their honeymoon, taking the precaution of sending a quarter of a million men along, so that the future Lord Leader could combine his love-making with war-making.

Having solved his main troubles, the Lord Leader gave himself up to the chore of aging gracefully and of thinking out ways and means whereby his other heirs might be spared from the death which the thoughtful Lydia was undoubtedly planning for them.

The Lord Leader was dying. He lay in his bed of pillows sweating out his last hours. All the wiles of the palace physician—including an ice-cold bath, a favorite remedy of his, failed to rally the stricken great man. In a few hours, the patronate was informed, and state leaders were invited to officiate at the death bed. The Linn of Linn had some years before introduced a law to the effect that no ruler was ever to be allowed to die incommunicado. It was a thoughtful precaution against poisoning, which he had considered extremely astute at the time, but which now, as he watched the crowds surging outside the open doors of his bedroom, and listened to the subdued roar of voices, seemed somewhat less than dignified.

He motioned to Lydia. She came gliding over, and nodded at his request that the door be closed. Some of the people in the bedroom looked at each other, as she shooed them away, but the mild voice of the Lord Leader urged them, and so they trooped out. It took about ten minutes to clear the room. The Lord Leader lay, then, looking sadly up at his wife. He had an unpleasant duty to perform, and the unfortunate atmosphere of imminent death made the affair not less but more sordid. He began without preliminary:

"In recent years I have frequently hinted to you about fears I have had about the health of my relatives. Your reactions have left me no recourse but to doubt that you now have left in your heart any of the

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tender feelings which are supposed to be the common possession of womankind."

"What's this?" said Lydia. She had her first flash of insight as to what was coming. She said grimly, "My dear husband, have you gone out of your head?"

The Lord Leader went on calmly: "For once, Lydia, I am not going to speak in diplomatic language. Do not go through with your plans to have my relatives assassinated as soon as I am dead."

The language was too strong for the woman. The color deserted her cheeks, and she was suddenly as pale as lead. "I," she breathed, "kill your kin!"

The once steel-gray, now watery eyes stared at her with remorseless purpose. "I have put Jerrin and Draid beyond your reach. They are in command of powerful armies, and my will leaves explicit instructions about their future. Some of the men, who are administrators, are likewise protected to some extent. The women are not so fortunate. My own two daughters are safe, I think. The elder is childless and without ambition, and Gudrun is now the wife of Tews. But I want a promise from you that you will not attempt to harm her, and that you will similarly refrain from taking any action against her three children, by her first marriage. I want your promise to include the children of my two cousins, my brother and sister, and all their descendants, and finally I want a promise from you about the Lady Tania, her two daughters, and her son, Lord Clane."

"Clane!" said Lydia. Her mind had started working as he talked. It leaped past the immense insult she was being offered, past all the names, to that one individual. She spoke the name again, more loudly: *"Clane!"*

Her eyes were distorted pools. She glared at her husband with a bitter intensity. "And what," she said, "makes you think, who suspect me capable of such crimes, that I would keep such a promise to a dead man?"

The old man was suddenly less bleak. "Because, Lydia," he said quietly, "you are more than just a mother protecting her young. You are the Lady Leader whose political sagacity and general intelligence made possible the virtually united empire, which Tews will now inherit. You are at heart an honest woman, and if you made me a promise I think you would keep it."

She knew he was merely hoping now. And her calmness came back. She watched him with bright eyes, conscious of how weak was the power of a dying man, no matter how desperately he strove to fasten his desires and wishes upon his descendants.

"Very well, my old darling," she soothed him, "I will make you the promise you wish. I guarantee not to murder any of these people you have mentioned."

The Lord Leader gazed at her in despair. He had, he realized, not remotely touched her. This woman's

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basic integrity—and he knew it was there—could no longer be reached through her emotions. He abandoned that line immediately.

"Lydia," he said, "don't anger Clane by trying to kill him."

"Anger him!" said Lydia. She spoke sharply, because the phrase was so unexpected. She gazed at her husband with a startled wonder, as if she couldn't be quite sure that she had heard him correctly. She repeated the words slowly, listening to them as if she somehow might catch their secret meaning: "Anger him?"

"You must realize," said the Lord Leader, "that you have from fifteen to twenty years of life to endure after my death, provided you hoard your physical energies. If you spend those years trying to run the world through Tews, you will quickly and quite properly be discarded by him. That is something which is not yet clear to you, and so I advise you to reorientate yourself. You must seek your power through other men. Jerrin will not need you, and Draid needs only Jerrin. Tews can and will dispense with you. That leaves Clane, of the great men. He can use you. Through him, therefore, you will be able to retain a measure of your power."

Her gaze was on his mouth every moment that he talked. She listened as his voice grew weaker, and finally trailed into nothingness. In the silence that fell between them, Lydia sat comprehending at last, so it seemed to her. This was Clane talking through his dying grandfather. This was Clane's cunning appeal to the fears she might have for her own future. The Clane who had frustrated her designs on the slave girl, Selk, was now desperately striving to anticipate her designs on him.

Deep inside her, as she sat there watching the old man die, she laughed. Three months before, recognizing the signals of internal disintegration in her husband, she had insisted that Tews be recalled from Venus, and Jerrin appointed in his place. Her skill in timing was now bearing fruit, and it was working out even better than she had hoped. It would be at least a week before Tews' spaceship would arrive at Linn. During that week the widow Lydia would be all-powerful.

It was possible that she would have to abandon her plans against some of the other members of the family. But they at least were human. It was Clane, the alien, the creature, the nonhuman, who must be destroyed at any cost.

She had one week in which she could, if necessary, use three whole legions and a hundred spaceships to smash him and the gods that had made him.

The long, tense conversation had dimmed the spark of life in the Lord Leader. Ten minutes before sunset, the great throngs outside saw the gates open, and Lydia leaning on the arms of two old patrons came dragging out, followed by a crowd of noblemen. In a moment it was general knowledge that the Linn of Linn was dead.

Darkness settled over a city that

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for fifty years had known no other ruler.

Lydia wakened lazily on the morrow of the death of the Lord Leader. She stretched and yawned deliciously, reveling in the cool, clean sheets. Then she opened her eyes, and stared at the ceiling. Bright sunlight was pouring through open windows, and Dalat hovered at the end of the bed.

"You asked to be wakened early, honorable lady," she said.

There was a note of respect in her voice that Lydia had never noticed before. Her mind poised, pondering the imponderable difference. And then she got it. The Linn was dead. For one week, she was not the legal but the *de facto* head of the city and state. None would dare to oppose the mother of the new Leader—uh, the Lord Adviser Tews. Glowing, Lydia sat up in the bed.

"Has there been any word yet from Meerl?"

"None, gracious lady."

She frowned over that. Her assassin had formed a relationship with her, which she had first accepted reluctantly, then, recognizing its value, with smiling grace. He had access to her bedroom at all hours of the day or night. And it was rather surprising that he to whom she had intrusted such an important errand, should not have reported long since.

Dalat was speaking again. "I think, madam, you should inform him, however, that it is unwise for him to have parcels delivered here addressed to himself in your care."

Lydia was climbing out of bed. She looked up, astounded and angry.

"Why, the insolent fool, has he done that? Let me see the parcel."

She tore off the wrapping, furiously. And found herself staring down at a vase filled with ashes. A note was tied around the lip of the vase. Puzzled, she turned it over and read:

Dear Madam:

Your assassin was too moist. The atom gods, once roused, become frantic in the presence of moisture.

Signed, Uranium
For the council of gods.

CRASH! The sound of the vase smashing on the floor shocked her out of a blur of numbness. Wide-eyed, she stared down at the little pile of ashes amid the broken pieces of pottery. With tense fingers she reached down, and picked up the note. This time, not the meaning of the note, but the signature, snatched at her attention: *Uranium.*

It was like a dash of cold water. With bleak eyes, she gazed at the ashes of what had been Meerl, her most trustworthy assassin. She realized consciously that she felt this death more keenly than that of her husband. The old man had hung on too long. So long as life continued in his bones, he had the power to make changes. When he had finally breathed his last, she had breathed easily for the first time in years, as if a weight had lifted from her soul.

But now—a new weight began to settle in its place, and her breath

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came in quick gasps. She kicked viciously at the ashes, as if she would shove the meaning of them out of her life. How could Meerl have failed? Meerl, the cautious, the skillful, Meerl the bold and brave and daring!

"Dalat!"

"Yes, Lady?"

With narrowed eyes and pursed

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lips, Lydia considered the action she was contemplating. But not for long.

"Call Colonel Maljan. Tell him to come at once."

She had one week to kill a man. It was time to come out into the open.

Lydia had herself carried to the foot of the hill that led up to the estate of Lord Clane. She wore a heavy veil and used as carriers slaves who had never appeared with her in public, and an old, unmarked chair of one of her ladies in waiting. Her eyes, that peered out of this excellent disguise, were bright with excitement.

The morning was unnaturally hot. Blasts of warm air came sweeping down the hill from the direction of Clane's house. And, after a little, she saw that the soldiers one hundred yards up the hill, had stopped. The pause grew long and puzzling, and she was just about to climb out of the chair, when she saw Maljan coming towards her. The dark-eyed, hawk-nosed officer was sweating visibly.

"Madam," he said, "we cannot get near that fence up there. It seems to be on fire."

"I can see no flame." Curtly.

"It isn't that kind of a fire."

Lydia was amazed to see that the man was trembling with fright. "There's something unnatural up there," he said. "I don't like it."

She came out of her chair then, the chill of defeat settling upon her. "Are you an idiot?" she snarled. "If you can't get past the fence, drop men from spaceships into the grounds."

"I've already sent for them," he said, "but—"

"BUT!" said Lydia, and it was a curse. "I'll go up and have a look at that fence myself."

She went up, and stopped short where the soldiers were gasping on the ground. The heat had already blasted at her, but at that point it took her breath away. She felt as if her lungs would sear inside her. In a minute her throat was ash dry.

She stooped behind a bush. But it was no good. She saw that the leaves had seared and darkened. And then she was retreating behind a little knoblike depression in the hill. She crouched behind it, too appalled to think. She grew aware of Maljan working up towards her. He arrived, gasping, and it was several seconds before he could speak. Then he pointed up.

"The ships!" he said.

She watched them creep in low over the trees. They listed a little as they crossed the fence, then sank out of sight behind the trees that hid the meadow of Clane's estate. Five ships in all came into sight and disappeared over the rim of the estate. Lydia was keenly aware that their arrival relieved the soldiers sprawling helplessly all around her.

"Tell the men to get down the hill," she commanded hoarsely, and made the hastiest retreat of all.

The street below was still almost deserted. A few people had paused to watch in a puzzled fashion the activities of the soldiers, but they

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moved on when commanded to do so by guards who had been posted in the road.

It was something to know that the campaign was still a private affair.

She waited. No sound came from beyond the trees where the ships had gone. It was as if they had fallen over some precipice into an abyss of silence. Half an hour went by, and then, abruptly, a ship came into sight. Lydia caught her breath, then watched the machine float towards them over the trees, and settle in the road below. A man in uniform came out. Maljan waved at him, and ran over to meet him. The conversation that followed was very earnest. At last Maljan turned, and with evident reluctance came towards her. He said in a low tone:

"The house itself is offering an impregnable heat barrier. But they have talked to Lord Clane. He wants to speak to you."

She took that with a tense thoughtfulness. The realization had already penetrated deep that this stalemate might go on for days.

If I could get near him, she decided, remorselessly, *by pretending to consider his proposals—*

It seemed to work perfectly. By the time the spaceship lifted her over the fence, the heat that exuded from the walls of the house had died away to a bearable temperature. And, incredibly, Clane agreed that she could bring a dozen soldiers into the house as guards.

As she entered the house, she had her first sense of eeriness. There was no one around, not a slave, not a movement of life. She headed in the direction of the bedroom, more slowly with each step. The first grudging admiration came. It seemed unbelievable that his preparations could have been so thorough as to include the evacuation of all his slaves. And yet it all fitted. Not once in her dealings with him had he made a mistake.

"Grandmother, I wouldn't come any closer."

She stopped short. She saw that she had come to within a yard of the corridor that led to his bedroom. Clane was standing at the far end, and he seemed to be quite alone and undefended.

"Come any nearer," he said, "and death will strike you automatically."

She could see nothing unusual. The corridor was much as she remembered it. The drapes had been taken down from the walls, revealing the temple stone underneath. And yet, standing there, she felt a faint warmth, unnatural and, suddenly, deadly. It was only with an effort that she threw off the feeling. She parted her lips to give the command, but Clane spoke first:

"Grandmother, do nothing rash. Consider, before you defy the powers of the atom. Has what happened today not yet penetrated to your intelligence? Surely, you can see that whom the gods love no mortal can harm."

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The woman was bleak with her purpose. "You have misquoted the old saying," she said drably. "Whom the gods love die young."

And yet, once more, she hesitated. The stunning thing was that he continued to stand there less than thirty feet away, unarmed, unprotected, a faint smile on his lips. How far he has come, she thought. His nervous affliction, conquered now. And what a marvelously beautiful face, so calm, so confident.

Confident! Could it be that there *were* gods?

Could it be?

"Grandmother, I warn you, make no move. If you must prove that the gods will strike on my behalf, send your soldiers. BUT DO NOT MOVE YOURSELF."

She felt weak, her legs numb. The conviction that was pouring through her, the certainty that he was not bluffing brought a parallel realization that she could not back down. And yet she must.

She recognized that there was insanity in her terrible indecision. And knew, then, that she was not a person who was capable of conscious suicide. Therefore, quit, retreat, accept the reality of rout.

She parted her lips to give the order to retire when it happened.

What motive impelled the soldier to action was never clear. Perhaps he grew impatient. Perhaps he felt there would be promotion for him. Whatever the reason, he suddenly cried out, "I'll get his gizzard for you!" And leaped forward.

He had not gone more than a half dozen feet past Lydia when he began to disintegrate. He crumpled like an empty sack. Where he had been, a mist of ashes floated lazily to the floor.

There was one burst of heat, then. It came in a gust of unearthly hot wind, barely touched Lydia, who had instinctively jerked aside, but struck the soldiers behind her. There was a hideous masculine squalling and whimpering, followed by a mad scramble. A door slammed, and she was alone. She straightened, conscious that the air from the corridor was still blowing hot. She remained cautiously where she was, and called:

"Clane!"

The answer came instantly. "Yes, grandmother?"

For a moment, then, she hesitated, experiencing all the agony of a general about to surrender. At last, slowly:

"What do you want?"

"An end to attacks on me. Full political co-operation, but people must remain unaware of it as long as we can possibly manage it."

"Oh!"

She began to breathe easier. She had had a fear that he would demand public recognition.

"And if I don't?" she said at last.

"Death!"

It was quietly spoken. The woman did not even think to doubt. She was being given a chance. But there was one thing

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more, one tremendous thing more.

"Clane, is your ultimate goal the Lord Leadership?"

"No!"

His answer was too prompt. She felt a thrill of disbelief, a sick conviction that he was lying. But she was glad after a moment that he had denied. In a sense it bound him. Her thoughts soared to all the possibilities of the situation, then came down again to the sober necessity of this instant.

"Very well," she said, and it was little more than a sigh, "I accept."

Back at the palace, she sent an assassin to perform an essential operation against the one outsider who knew the Lady Lydia had suffered a major defeat. It was late afternoon when the double report came in: The exciting information that Tews had landed sooner than anticipated, and was even then on his way to the palace. And the satisfying words that Colonel Maljan lay dead in an alleyway with a knife in one of his kidneys.

It was only then that it struck her that she was now in the exact position that her dead husband had advised for her own safety and well-being.

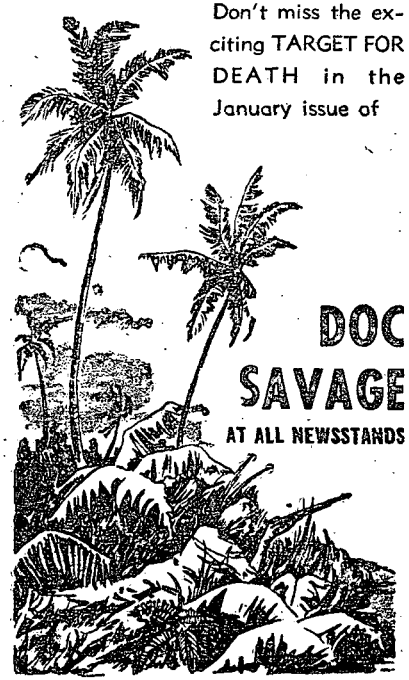
Tears and the realization of her great loss came as late as that.

THE END.

Lieutenant Treat was a beauty. A Navy nurse. She expected to hear from her fiancé that day in Honolulu . . . but she didn't. Instead, she got a strange message that led to a mess of bloodshed and horror!

MESSAGE OF LOVE . . . OR MESSAGE OF HATE?

It was time for Pat Savage, lovely cousin of Doc Savage, to come to the rescue . . . *she* thought! But Doc himself thought differently — and went to a lot of trouble to prove it. Don't miss the exciting TARGET FOR DEATH in the January issue of



DOC SAVAGE

AT ALL NEWSSTANDS

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BRASS TACKS

We're not through making changes, either! Watch that title on the cover!

Dear Mr. Campbell:

Your prophecy that the June issue of Astounding would have some improvements was certainly fulfilled, particularly concerning the art work. The inside illustrations were better than the cover; particularly excellent was the one for "The Chronokinesis of Jonathan Hull." Keep Swenson.

"Measuring Rod" was the best article on Moon Contact I have read anywhere, and believe me, I've seen plenty. It covered most of the problems and phases of the operation, and yet did not get too complicated for even the most non-technical reader.

Now for a few cryptic comments: Rocklynne's space opera of "The Bottled Men" wasn't so bad. Plot of "Forecast" was rather thin, although some of the ideas were interesting. Boucher's story the best in the issue. Is Sturgeon slipping? From his last few stories, it would seem so.

All in all, a right good issue. Let's have more stories of the Foundation and more by Fritz Leiber.

In case this sees light in Brass Tacks, I would like to say to all readers of imaginative fiction that live in North Carolina, that plans are in progress for an organization to bring together all fans in this state and to further the interests of science fiction. You owe it to yourself to look into the matter further. A postal or letter to me will bring details. Please rally round!—Andy Lyon, 200 Williamsboro Street, Oxford, North Carolina.

"Meihem" seemed quite popular.

Dear Mr. Campbell:

Here are my ratings for the September Astounding.

1—"Vintage Season." I believe

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that this story could be called a "triple A." A wonderful bit of writing. I don't believe I need to say more.

2.—"Evidence." Again a good story for which little criticism is needed. This would be B plus on my scale, better than normal.

3—"Blind Time." A good B story. Enough paradox to be amusing, enough thought to be good on that count. Aside from the fact that the burning of Peter's hand as the "searing pain" is not too clearly put, it was continuous.

4—"The Toymaker." B—. A reasonably good story, but no punch.

5—"Slaves of the Lamp." Same criticism.

Articles:

1—"Second Approximation."

2—"Meihem in Ce Klasrum"—very nice idea. Send it to Washington and let them read it.

3—"Congress is too busy"—Have heard it before.—Timothy Orrok, 5 Cleveland Street, Cambridge 38, Massachusetts.

The answers, in general terms.

Dear John:

This is in reply to Jerry Shelton's paging in the September Issue. I don't know the answer to question No. 3, and I am at the present moment not too much interested in how a fly lands on a ceiling, but I do know what to answer to questions No. 1, 2 and 4.

Question No. 1. Of course the axis of the shell continues to point in the direction which it had in the gun barrel. You might also say that the longitudinal axis of a rotating shell, if fired with a speed considerably exceeding the speed of sound, maintains the gun's elevation. In an airless space that would apply strictly, what air resistance does to the shell will be discussed later.

Question No. 2. A shell fired at an angle of between 70 and 90 degrees will surely land on its tail, especially if it is a shell with a so-called "windshield" or hollow nose. The Germans specialized during two wars in very heavy siege artillery, firing shells of a ton or more at a minimum angle of 68 degrees. They were all base fuzed and I don't think that was an accident.

Question No. 3. I don't know the answer to that.

Question No. 4. It is not simply a question of elevation, but a melange of a long list of factors, of which the elevation of the gun and the position of the center of gravity in relation to the center of air resistance are the most important. Since there are so many factors involved, the chance that the shell will strike the target in a position which makes the fuze go off is high, but "belly landings" without explosion are fairly customary in experimental types. Explosions on the bounce are also not at all rare if a battery fires at extreme range.

Now, after these specific answers let's have a look at what happens to a shell fired at an elevation of 45 degrees with a muzzle velocity higher than twice the velocity of

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sound. At first longitudinal axis and tangent to the trajectory very nearly coincide, the "center of air resistance" is located just behind the nose of the shell. But as the shell progresses along its trajectory, the angle between longitudinal axis and tangent to the trajectory increases—it can be a Right angle just before hitting or about 45 degrees to the ground—and the center of air resistance slides down. The forces tend to turn the shell over, up and backward so that, if they succeeded, the shell might continue bottom first, until it is turned over again. Such behavior has actually been observed in poorly balanced projectiles that did not rotate fast enough. But if the projectile is well balanced and rotates fast enough, we have, in effect, a gyroscope.

Being a gyroscope, precession is inevitable, with the result that the axis of the shell is forced somewhat off the trajectory, either to the right or to the left, depending on whether the rotation is clockwise or counterclockwise.

The motion of the point of the shell, as a result of all this, looks like a pulled-out spring, while the longitudinal axis of the shell traces cones into the air. The center line of the "spring" does NOT coincide with the trajectory, in fact the whole "spring" lies outside the trajectory, usually to the right. Center line of the motion of the shell's head and trajectory are parallel to each other. The center of the shell's bottom describes a similar movement, but much smaller.

If the designer is very skillful—and somewhat lucky—he will succeed in fitting rotation, precession, balancing et cetera together in such a manner that the axis of the shell will reasonably agree with the direction of the trajectory, whatever lack of agreement there is will show up the more the longer the range.

But that, gentlemen, is only part of the story. The spinning shell is "of course," subject to the Magnus Effect, the same effect which was utilized in the so-called Flettner rotors. Since the shell takes some of the air along, one side of the shell will show a reduction in air density, the other an increase. The Magnus effect tends to push the shell sidewise, in the opposite direction in which the spinning shell itself tends to act. There is another air resistance factor which, in turn, tries to cancel out the Magnus effect. Which of the two is stronger, depends mostly on the elevation of the gun, beginning with about 60 degrees the Magnus effect usually gets the upper hand. A Russian howitzer of the vintage of 1903 succeeded to land its shells *behind* its own position when fired at elevations above 60 degrees in a high wind. (*That* started investigation of the Magnus effect which then did not have a name.)

All this is a simplified picture of the movement of a shell fired with supersonic velocity. A shell fired with subsonic velocity acts differently, here we find that everything gets so much worse that spin just does not provide a good stabilization any more. Hence stabilization after

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the principle of the arrow is used, with tail fins which artificially produce air resistance at the extreme tail end. It is for this reason that slow projectiles, like mortar shells and bombardment rockets, have tail fins.

The combination of tail fins, heavy nose and lack of spin actually forces the longitudinal axis to follow the trajectory; but that works for subsonic velocities only. —Willy Ley.

"World of Ā may have a sequel—some time. Van Vogt's not very definite!

Dear Mr. Campbell:

For the August issue of ASF my ratings are:

1. Child of the Gods
2. Slaves of the Lamp
3. The Last Objective
4. Bankruptcy Proceedings
5. The Cat and the King

As a psychologist I read this issue with mixed feelings. "The Last Objective" raised my temperature. As you say, warnings are all right but why pessimism? With a steady diet of it a person is inclined to say, "What's the use," and lay down his tools with a morose look on his face. I don't mind warnings but I like to have them end with the theme that we can tackle anything—even if we can't. It is a much healthier philosophy. And that Carpenter should have been called anything but a psychologist. Before a man in my profession can even think of being a success he should have the ability to make people at ease, to make people like him. The team of the cruiser should have been integrated to the fullest extent by Carpenter's presence. Somehow I like to read stories like that though. Carter put all his conflicts on paper. It is easier to analyze a man after finishing such a story than after a ten hour talk with the man himself.

In Brass Tacks I have not seen the appraisal that "The World of Ā" deserves. Quite a while ago I tore out the three installments of that story and put it under one cover. I have been passing it around to several of my friends who are nonreaders of ASF. The reactions have been many. One woman who is very well read but lacks a

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four-dimensional aspect was shocked by the whole thing. It just wasn't literature. She was deplored that I read such trash. It took me several hours of argument to make her concede that there was something in it. She was especially horrified by the Machine. Even though it was as complex as a man she could not visualize a hunk of glass and metal with a soul. As far as I am concerned it is the complexness and organization of the matter that makes the so-called soul. When that organization is destroyed, the soul is destroyed. (I still believe in immortality: your consciousness continues in another body with other thoughts. I would hate an immortal life in "Heaven" as I would hate it on earth. With the continuation of the consciousness I may find myself some day in an integrated body like Gosseyn's without the warps of my present mind and I can also see how "it" turns out. The desire of the preservation of the Self is a development of the same phychology that Zagat uses in "Slaves of the Lamp.")

A physicist friend had quite a different reaction to the Machine. He immediately drew a rough sketch of a neuron tube saying that an electronic brain could not be built today only because we had next to no idea of how the circuits of the brain were connected and why.

He liked van Vogt's ingravity plates for the simple reason that they required power. He was very disheartened that the slowest fall ever clocked was five miles an hour. Even with reduced gravity a man would accelerate. To me the ingravity parachute was just an example of how Null A would work.

Immediately after reading the theory of the multitudinous Gosseyns a biologist friend presented a theory of developing the genes without fertilization. It was highly speculative and required a great deal of original research in all biological fields. He seemed very intrigued by the idea and talked to me for several hours on it. In giving all the Gosseyns the same thoughts he disregarded the Similarity Laws using instead a mental telepath receiver and amplifier. (About the same thing as far as I'm concerned. That does not mean I do not believe in mental telepathy. I've had it happen to me several times.)

I did not criticize the novel from the same viewpoint as my friends. I thought—and they—that van Vogt did a marvelous job in giving us an idea on the complexity of future science. Every word he put in the story suggested ten words behind it. Each individual gadget did not receive my concentrated attention, I let them form a background to the story in a way that only van Vogt can do.

In the realm of his good job we did not include the Similarity Concept though vV developed it excellently. It was all right for the stellar ship and the distorter and some of the other contrivances but when Gosseyn started passing through walls and making matter disappear by focusing two cubes together and making a doorknob

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look like a cat why that was too much to swallow. It is that same desire that van Vogt naively puts in his story that has made man turn out autos and planes and will make him turn out rockets and pneumotrains in the future. I suppose that if a stellar ship could do it Gosseyn's brain could do it but I still have to see a man—mutant or otherwise—exude rayon from a hole in his skull or emit radar waves. What are machines good for anyway? I like to think that Gosseyn did not go through the wall, that he escaped by some very human method that only a stimulated man resorts to (adrenaline and all that). And then, the novel was not based on Similarity. The concept was just a girder in a great building; if it was gone the building would not collapse.

Out of the "World of Ā" I have taken more sound psychology than from any one of the books on my shelves and in a much more readable form. A person can get a lot from a book like that if he looks. It can do a lot to unwarp a man's mind, to make him see the world more clearly.

Van Vogt presented an educational program which is man's only means of saving himself. (I have seen such a plan before, including non-Aristotelianism, but only as a factual skeleton.) It is a program we could start developing now. We should but we probably won't until after the third world war—after we recover. And what a war that's going to be. Has any one heard about the new Russian rocket that has been bombarding Sweden. I have calculated that its range must be at least 350 miles if it starts from Peenemunde. Its maximum range is probably much greater as one came over Stockholm horizontally with its motors on using, possibly, some device to correct for its inaccuracies. Getting back to van Vogt, would it be possible to have him or some other writer give us a story about how such an educational program will start?

I am eager to compare "The World of Ā" with "Slan" which I am buying from Arkham House, Sauk City, Wisconsin, for $2.50. It should be out by December. And how about spurring another super story out of van Vogt before the alloted five or six years are up or how about one from Campbell (like the "Mightiest Machine") or are editors too busy? And by the way what has happened to E. E. Smith and Heinlein or have they kicked off?

I put Jones' story at the bottom of my list because I don't like stories about corrupt capitalists. There are some, of course, but they receive far too much publicity for their numbers. What about a story of a Ford or Greyhound of the future who is *not* fighting one of these corrupt companies?

Did Orban graduate or did he die? He was the best illustrator I have ever seen in science-fiction. The only thing he could not draw was spaceships. Swenson is better than most illustrators who have appeared in Astounding. He goes in for exactly the opposite effect from

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Orban and therefore they are hardly comparable. His first spaceships appeared in August issue. The one on page 156 was terrible; worse than Williams' pointed nosed craft. As to the illustration on page 39 I still say it will be cold in New England in the 25th century, atomic energy notwithstanding.

And while I am at it tell Latham to keep time machines out of his stories when they are not necessary. He has a funny idea of the future. Everything is just the same, only bigger. I maintain that no one will ever build a 300-inch telescope on a planet the size of Earth—never ever. Read the problems of the 200-incher and see if you don't agree. Space is the only place for telescopes and besides with a Farnsworth tube electron telescope what is the use? And also tell Mr. Latham that there ain't gonna be no fourth world war leastwise not until 2250 A.D.!!!

Puff Puff!—W. P. Key, 9 Elm Street, Middletown, Vermont.

Yep, we did get a raft of letters!

Dear Mr. Campbell:

Spelling reform is one of those queer things that attract interest out of all proportion to their importance. I doubt not you'll get a raft of letters on "Meihem in Ce Klasrum." Here is my dime's worth.

In the first place, Mr. Edwards greatly underestimates the conservative sentiment which would oppose his program. This sentiment, entrenched in Congress, threw Theodore Roosevelt for a loss when he attempted a modest simplification program. It is not only the instinctive aversion to change which is involved, but also the vested interest in, for example, trademarks which would be rendered unintelligible. More important would be the immense obsolescence of printed matter. Any flaws in the simplification program would be pounced upon and exploited to the utmost. Unfortunately, there are many flaws in such systems as Edwards'.

The greatest fallacy is that a one-symbol: one-sound correlation is possible with our present alphabet of twenty-six characters and the English language which is said to have forty-odd different clusters of sounds. If the o-s:o-s ideal is aimed at, the only possibility is something like the International Phonetic Alphabet, with which Edwards seems as unacquainted as Fred Nash.

It is worth remarking how many spelling-reformers dive into the work without reading up on the multitudes of suggestions that have already been made. (As a starter, I suggest the page samples in the *World Almanac*.) Also, all too often they have not troubled to acquire the rudiments of phonetics. (The introduction to Webster's unabridged is an easily available source.) Mr. Edwards is not necessarily subject to this criticism; the spelling system he aims toward seems to be one of the better-constructed ones. But a number of objections can be raised to it.

Many people will quite properly

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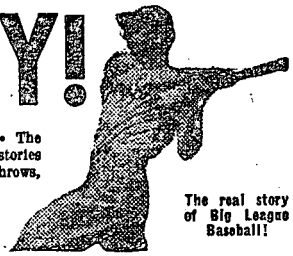

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raise their eyebrows at a system which claims to reduce the average length of words but spells by bai, later leiter, and children tshildren. These changes may be phonetically sound, but having gone so far, Mr. Edwards cannot excuse stopping there. Our common o is a diphthong too, and j is a compound. Perhaps the overall effect would be a reduction in the length of words, but it is hard to justify using two symbols to indicate a sound which in English is treated as a unit. It would seem more sensible to have a single symbol for each diphthong, combination, or phoneme which is handled by speakers as a single sound. Related to this is the desirability of retaining the practice of using the same symbol for an affix which may distinctly change its pronunciation according to environment. -s is an example of this: Compare sees and seeks, cars and carts. -ed acts much the same way: sagged, sacked. Also under this general principle is the practice of spelling a word the same way even though, according to stress, (*the* man; the very man), its vowel sound may be distinct, or blurred down to one of the neutral unstressed vowels designated in the IPA by e and a upside-down, and in the Webster system by italicizing the particular vowel.

More special criticisms of Edwards' system: If he is going to use ai for the "long i" sound, and abolish servient e, he will find it difficult to distinguish long a. If you spell hate hait, it's indistinguishable from height, and it's out of the question to spell it hat. This is especially serious in view of his decree against "unnecessary" double letters, which by distinguishing closed syllables from open syllables when a suffix is added enable us to distinguish between mad haters and mad hatters. There is a method in the madness of English, you see, even though many words don't conform to it.

The chief virtue of Edwards' suggestion, and it is a doubtful one, seems to be the idea of a special week every year in which the simplification is progressively inaugurated. If we should ever be able to put such a thing across, it shouldn't be wasted on in-between systems such as that he employs, or the "scientific" alphabet Funk & Wagnalls have been trying to popularize. We should go the whole hog and adopt the International Phonetic Alphabet, or settle for the modest reformations agreed upon by the Simplified Spelling Board, given in the Merriam-Webster, and pushed by the Dewey decimal people.

But my latest opinion on the whole matter is that there are a lot of things which more urgently require our attention now than spelling reform.

I'm glad to see the "Astounding" disappearing; I wish that you could dispose of it altogether.—Jack Speer, 4518-16th N. E., Seattle 5, Washington.

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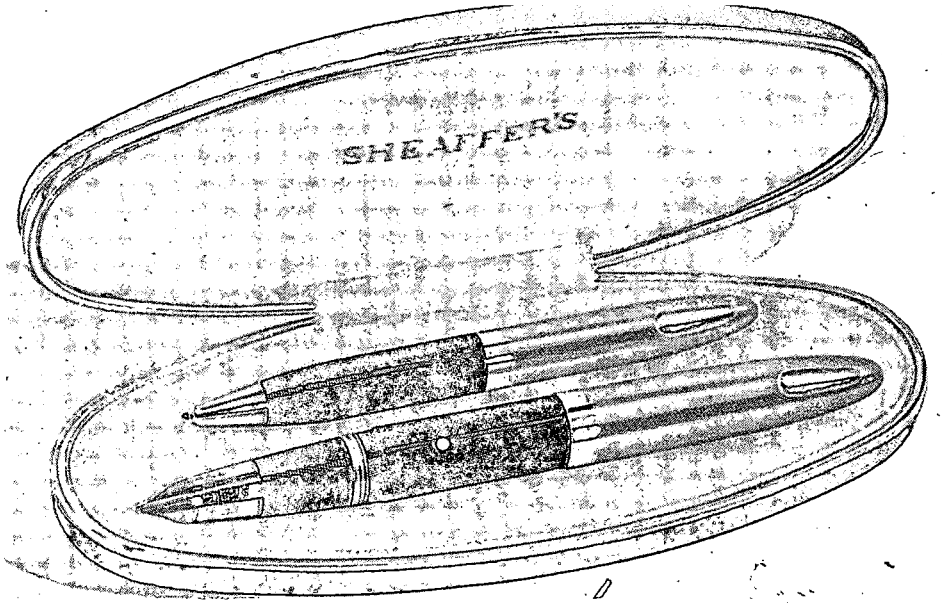

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